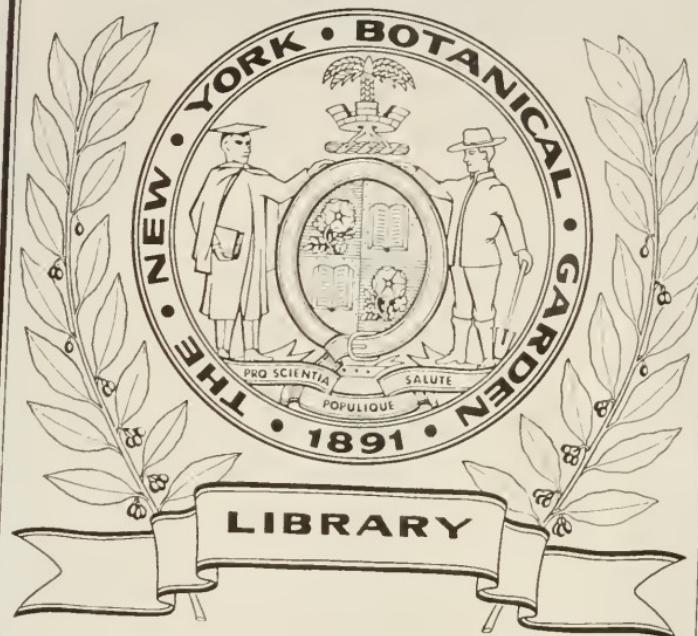


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Vol. 1
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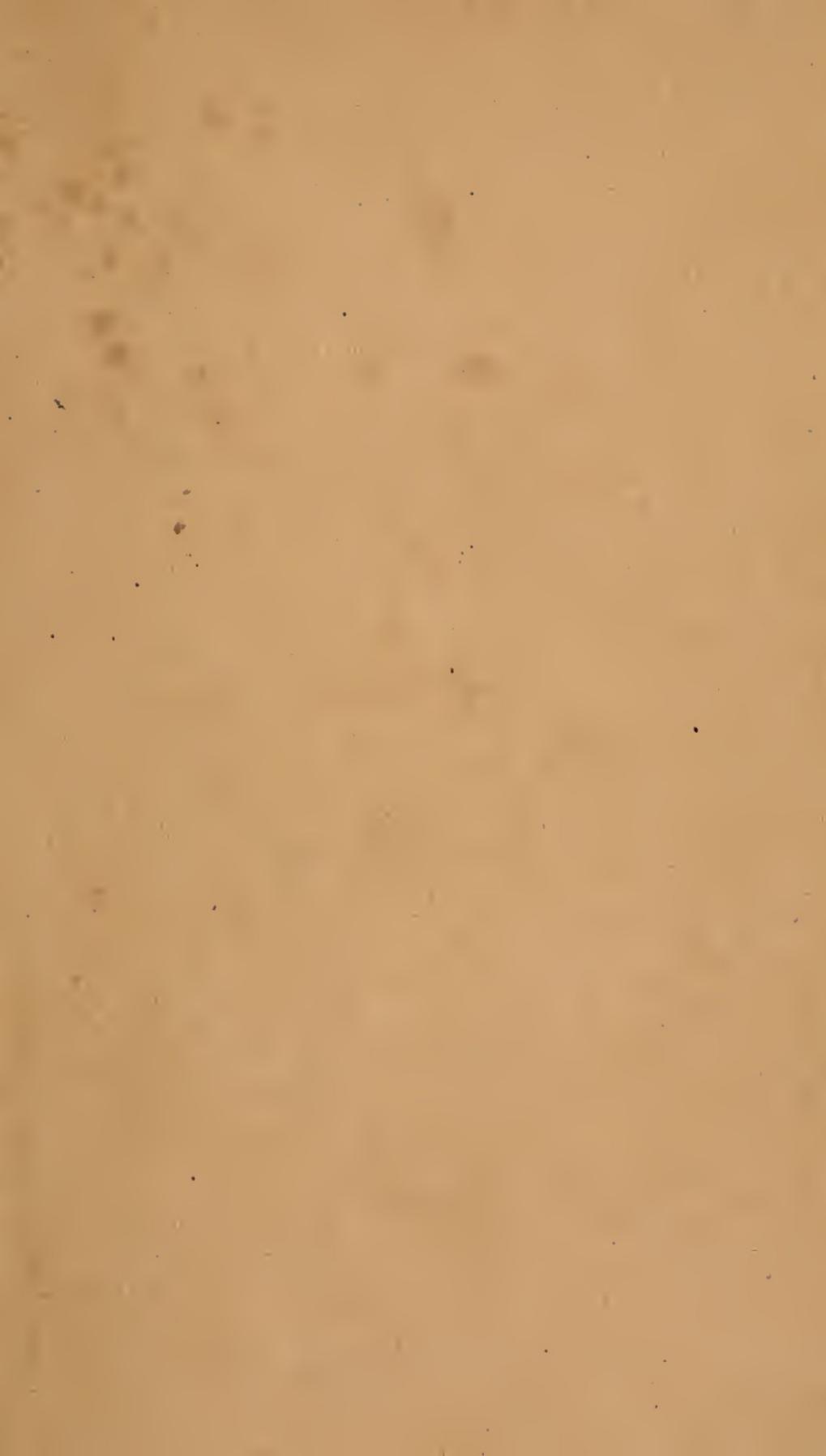
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6. *pp. 153-154, pl. 14, Jan 1895.*
(See also in *Archaeol. Amer.* 1895: 272.)

The lower part of the wall is a massive
and perfectly regular masonry made
in 1845, during the construction of the
foundations of the Society (see A. Ch. M. E. 1895, 62).

FRONTISPICE.



Interior of Orchideous House at Penllergare. (See p. 5.)

THE JOURNAL

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TABLE OF CONTENTS.

VOLUME I.

ORIGINAL COMMUNICATIONS:—

	Page
I. Some Account of an Orchideous House, constructed at Penllergare, South Wales. By J. D. Llewelyn, Esq., F.H.S.	5
II. Observations, Botanical and Physiological, on the Potato Murrain. By the Rev. M. J. Berkeley, M.A., F.L.S. (<i>With four plates</i>)	9
III. Chemical Observations on the Cause of the Potato Murrain. By Edward Solly, F.R.S., Experimental Chemist to the Horticultural Society, &c.	35
IV. Memoranda relating to the Cultivation of Melons. By John Williams, Esq., C.M.H.S.	42
V. Local Habitation and Wants of Plants. By the Hon. and Very Rev. William Herbert, F.H.S., Dean of Manchester	44
VI. The Main Points of Vine Cultivation. By Mr. Robert Errington	50
VII. Mode of Cultivating the Mango in England. By Mr. A. Scott	54
VIII. The Cultivation of the Starry Dysophyl, a Tropical Annual. By Mr. T. Moore	56
IX. Some Account of the Cryptomeria Japonica, or Japan Cedar. By Mr. George Gordon, A.L.S.	57
X. On the Propagation of Orchids in India. By Captain Charles Giberne, Acting Paymaster, S. Division of the Army	60
XI. On the Influence of Electricity on Vegetation. By Edward Solly, F.R.S., F.L.S., Hon. Memb. Royal Agricultural Society, Experimental Chemist to the Hort. Soc., &c.	81
XII. On the Ventilation of early Forcing-houses. By Mr. Thomas Moore	110
XIII. A Note upon the Wild state of Maize, or Indian Corn. By the Vice-Secretary	114
XIV. Some Account of the Jefferson Plum. By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen-Garden Department, in the Society's Garden (<i>with a Coloured Plate</i>)	117
XV. Outlines of a Natural History Calendar at Foo-chow-foo, the capital of the Chinese province of Fokien (lat. $26^{\circ} 4' S.$, long. $119^{\circ} 4' E.$). By the late G. Tradescant Lay, Esq., F.C.M.H.S., Her Majesty's Consul at that place	119
XVI. Memorandum concerning the Pine-apple Soil of the Bahamas. In a letter from the Hon. John Campbell Lees, C.M.H.S., dated Nassau, New Providence, Feb. 8, 1845	126
XVII. A Notice of Simmoun's Patent Hygrometer. By the Vice-Secretary	127

Article	Page
XVIII. On the Culture of Epiphyllum truncatum. By Mr. John Green, C.M.H.S., Gardener to Sir Edmund Antrobus, Bart., F.H.S.	130
XIX. The Method pursued in managing Erica hiemalis. By Mr. W. P. Ayres, C.M.H.S., Gardener to James Cook, Esq., F.H.S.	131
XX. Notes upon Begonias. By Mr. James Donald, <i>pro tempore</i> Superintendent of the Hothouse Department in the Society's Garden	132
XXI. An Account of Three new Varieties of the Apple. By John Williams, Esq., of Pitmaston, C.M.H.S.	143
XXII. Remarks on the Culture of the Pine Apple. By John Povey, Gardener to the Rev. J. Thornycroft, of Thornycroft Hall	144
— REPORT FROM THE COUNCIL	161
XXIII. On the Management of Fruit-Tree Borders. By Mr. Robert Reid, C.M.H.S., Gardener to Mrs. Clark of Noblethorpe, near Barnsley	176
XXIV. On the Treatment of the Genus Amaryllis for Autumnal Blooming. By Mr. John Spencer, C.M.H.S., Gardener to the Marquis of Lansdowne, F.H.S., at Bowood	178
XXV. Journal of a Mission to California in search of Plants. By Mr. Theodore Hartweg, in the service of the Horticultural Society. Part I.	180
XXVI. The late Mild Winter. An Extract from a Letter to the Vice-Secretary. By John Williams, Esq., C.M.H.S., of Pitmaston, near Worcester	186
XXVII. An Account of an American Mode of Propagating Dwarf Pear-Trees. In a letter to N. Longworth, Esq., President of the Cincinnati Horticultural Society. By W. Smith, M.D.	188
XXVIII. A further Account of Weigela Rosea. By Mr. Fortune and the Vice-Secretary. (<i>With a coloured plate</i>)	189
XXIX. Contributions to a History of the Relation between Climate and Vegetation in various parts of the Globe.—No. 1. The Vegetation of Rio Janeiro. By George Gardner, Esq., F.L.S., Director of the Royal Botanic Garden, Ceylon	191
XXX. A brief Account of the Naras Fruit, and of the attempts that have been made to cultivate it. By the Vice-Secretary	199
XXXI. Game Preserves and Fences. Part the First. By Mr. Alexander Forsyth, C.M.H.S., Gardener to the Earl of Shrewsbury at Alton Towers	201
XXXII. Sketch of a Visit to China, in search of New Plants. By Mr. R. Fortune, Superintendent of the Hothouse Department in the Garden of the Society	208
XXXIII. The late Mr. George Loddiges	224
XXXIV. On the Canker in Apple Trees. By Mr. Robert Errington, C.M.H.S., Gardener to Sir P. de Malpas Grey Egerton, Bart., M.P., F.H.S., Oulton Park, Tarporley, Cheshire	241
XXXV. Game Preserves and Fences. Part the Second. By Mr. Alexander Forsyth, C.M.H.S., Gardener to the Earl of Shrewsbury, F.H.S., at Alton Towers	244
XXXVI. On the Winter Culture of the Mignonette. By Mr. J. B. Whiting, C.M.H.S., Gardener to H. T. Hope, Esq., F.I.H.S.	256

Article		Page
XXXVII. Some Account of <i>Achimenes patens</i> , with its cultivation, and that of the species allied to it. By Mr. George Gordon, A.L.S., Superintendent of the Hardy Department in the Society's Garden. (<i>With a coloured plate</i>)	257	
XXXVIII. Observations on the Growth of the Pine Apple. By Mr. James Barnes, C.M.H.S., Gardener to the Lady Rolle, F.H.S., Bicton, near Sidmouth	260	
XXXIX. A Report upon the action of a Tubular Boiler, erected in the Garden of the Society. By Mr. R. Thompson, Superintendent of the Orchard and Kitchen Garden Department of the Society's Garden	262	
XL. Experimental Inquiry into the comparative effect of various Manures upon Kitchen Garden Crops. By Mr. R. Thompson, Superintendent in the Orchard and Kitchen Garden Department of the Society's Garden	264	
XLI. A Notice of the <i>Tein-ching</i> , or Chinese Indigo. By Mr. R. Fortune, Superintendent of the Hot-house Department in the Society's Garden	269	
XLII. Some Account of the Stanwick Nectarine. By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden	272	
XLIII. Contributions to a History of the Relation between Climate and Vegetation in various parts of the Globe.—No. 2. The Vegetation of the Organ Mountains of Brazil. By George Gardner, Esq., F.L.S., Director of the Royal Botanic Garden, Ceylon	273	
No. 3. The Vegetation of Bahia and Pernambuco	286	
No. 4. The Vegetation of Alagoas and the Rio de São Francesco	293	
XLIV. Notice of a New Grape called Josling's St. Alban's. By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden	296	

NEW PLANTS, &c., FROM THE SOCIETY'S GARDEN:—

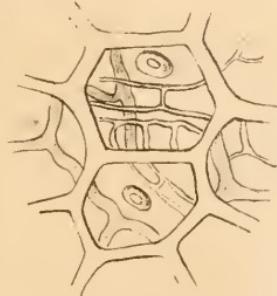
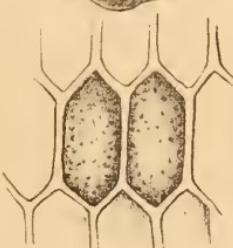
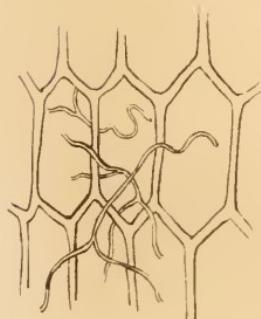
1. <i>Anemone Japonica</i>	61
2. <i>Buddleia Lindleyana</i>	62
3. <i>Ficus virgata</i>	63
4. <i>Abelia rupestris</i>	<i>ib.</i>
5. <i>Cattleya maxima</i>	64
6. <i>Weigela rosea</i>	65
7. <i>Pterostigma grandiflorum</i>	66
8. <i>Brassica Chinensis</i>	67
9. <i>Indigofera decora</i>	68
10. <i>Silene Schafta</i>	69
11. <i>Statice Fortuni</i>	70
12. <i>Calystegia pubescens</i>	<i>ib.</i>
13. The Shang-hai Han-Tsi	72
14. The Chusan Han-Tsi	<i>ib.</i>
15. <i>Rhynchospermum jasminoides</i>	74
16. <i>Sedum Kamtchaticum</i>	75
17. <i>Ophiopogon prolifer</i>	76
18. <i>Graellsia saxifragæfolia</i>	<i>ib.</i>
19. <i>Plumbago zeylanica</i>	146
20. <i>Cochlearia acaulis</i>	<i>ib.</i>
21. <i>Primula involucrata</i>	147
22. <i>Daphne Fortuni</i>	<i>ib.</i>

	Page
23. Edgworthia chrysanthia	148
24. Azalea ovata	149
25. Fortunaea chinensis	150
26. Azalea obtusa	152
27. Azalea squamata	<i>ib.</i>
28. Jasminum nudiflorum	153
29. The Cholwell Pear	154
30. The Calabrian Raisin	<i>ib.</i>
31. The White-Stemmed Amaranth	156
32. Gardenia florida, L.; var Fortuniana	226
33. Forsythia viridissima	<i>ib.</i>
34. Deutzia staminea	228
35. Hoo sung, or Oo-sung	<i>ib.</i>
36. Pittosporum glabratum	230
37. Berberis Fortuni	300 and 231
38. Campanula nobilis	232
39. Dielytra spectabilis	233
40. Achimenes patens	<i>ib.</i>
41. Pinus Montezumæ	234
42. Pinus Cembroides	236
43. Pinus Orizabæ	237
44. Clematis hexasepala	239
45. Adamia versicolor	298
46. Jacquemontia canescens	<i>ib.</i>
47. Stigmaphylloides mucronatum	299
48. Berberis Fortuni	231 and 300
49. Lysimachia candida	301
50. Stenanthium frigidum	302
51. Oncidium unguiculatum	303
52. Fuchsia tetradactyla	304
53. Platycodon grandiflorus	305
54. Abutilon rufinerve	306
55. Atropa acuminata	<i>ib.</i>
56. Clematis graveolens	307
57. Batatas Jalapa	308

MEMORANDA :—

Destruction of Insects	77
The Black Pine Beetle	79
Transmission of Bulbs from India	<i>ib.</i>
Asphalted Flower Stakes	<i>ib.</i>
Burnettized Linen	80
Mr. Hoare's Vine Columns	<i>ib.</i>
Manures	159
New Peas	160
Mammillaria pulchra treated as an aquatic	240
Ward's Cases in Miniature	<i>ib.</i>
Manures	309
Brocoli	<i>ib.</i>

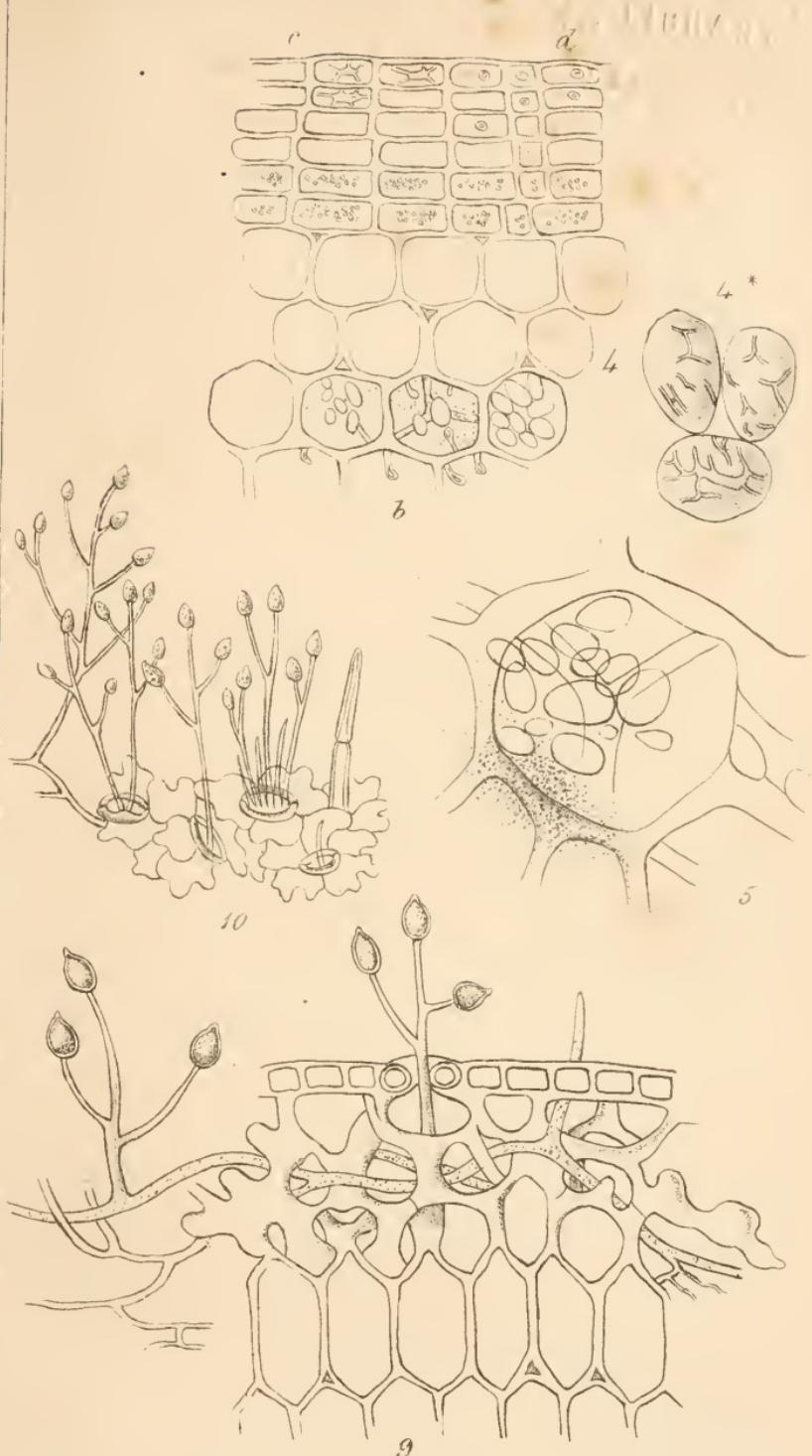
PROCEEDINGS AT MEETINGS OF THE SOCIETY, from January 16, 1844, to April 21, 1846.



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Reeve Brothers Imp

The Potato disease.



Reeve Brothers, imp

The Potato disease.



Reeve Brothers. imp.

The Potato disease.





Reeve Brothers, imp.

The Potato disease.



The Jefferson Plum.





1880 Frake del.

Ernst August & Sohn lithographis.

Geranium palustre.

ORIGINAL COMMUNICATIONS.

I.—*Some Account of an Orchideous House, constructed at Penllegare, South Wales.* By J. D. Llewelyn, Esq., F.H.S.

(Communicated October 28, 1845.)

[Mr. Llewelyn having mentioned to the Vice-Secretary that he had constructed an epiphyte house, through which a waterfall had been directed so as to dash over rocks, and finally to flow into a basin forming the floor of the house, that gentleman was solicited to favour the Society with some account of it, which he has done in the following interesting communication, accompanied by an interior view of the house, which forms the frontispiece of the present volume.]

I enclose with this the ground-plan and section of the stove, which I promised to send. These will show the size and shape of the building, and the arrangement of its pipes and heating apparatus, and the manner also in which the water for the supply of the cascade is conducted to the top of the house by means of a pipe communicating with a pond at a higher level. This pipe is warmed by passing with a single coil through the boiler, and terminates at the top of the rock-work, where it pours a constant supply of water over three projecting irregular steps of rough stone, each of which catches the falling stream, dividing it into many smaller rills and increasing the quantity of misty spray. At the bottom the whole of the water is received into the pool which occupies the centre of the floor of the stove, where it widens out into an aquarium ornamented with a little island overgrown like the rock-work with *Orchideæ*, ferns, and lycopods.

The disposition of the stones in the rock-work would depend much on the geological strata you have to work with: in my case they lie flat and evenly bedded, and thus the portions of the rock-work are placed in more regular courses than would be necessary in many other formations. In limestone or granite countries, designs much more ornamental than mine might, I think, be easily contrived.

The account of the splendid vegetation which borders the cataracts of tropical rivers, as described by Schomburgk, gave me the first idea of trying this experiment. I read in the ‘Sertum Orchidaceum’ his graphic description of the falls of the Berbice and Essequibo, on the occasion of his first discovery of *Huntleya violacea*. I was delighted with the beautiful picture which his words convey, and thought that it might be better represented than is usual in the stoves of this country.

With this view I began to work, and added the rock-work which I describe to a house already in use for the cultivation of

Orchideous plants. I found no difficulty in re-arranging it for its new design, and after a trial now of about two years can say that it has entirely answered the ends I had in view.

The moist stones were speedily covered with a thick carpet of seedling ferns, and the creeping stems of tropical lycopods, among the fronds of which many species of orchidæ delighted to root themselves.

Huntleya violacea was one of the first epiphytes that I planted, and it flowered and thrived in its new situation, as I hoped and expected. The East Indian genera, however, of *Vanda*, *Saccolabium*, *Aerides*, and other caulescent sorts, similar in habit and growth, were the most vigorous of all, and many of these in a very short time only required the use of the pruning-knife to prevent their overgrowing smaller and more delicate species.

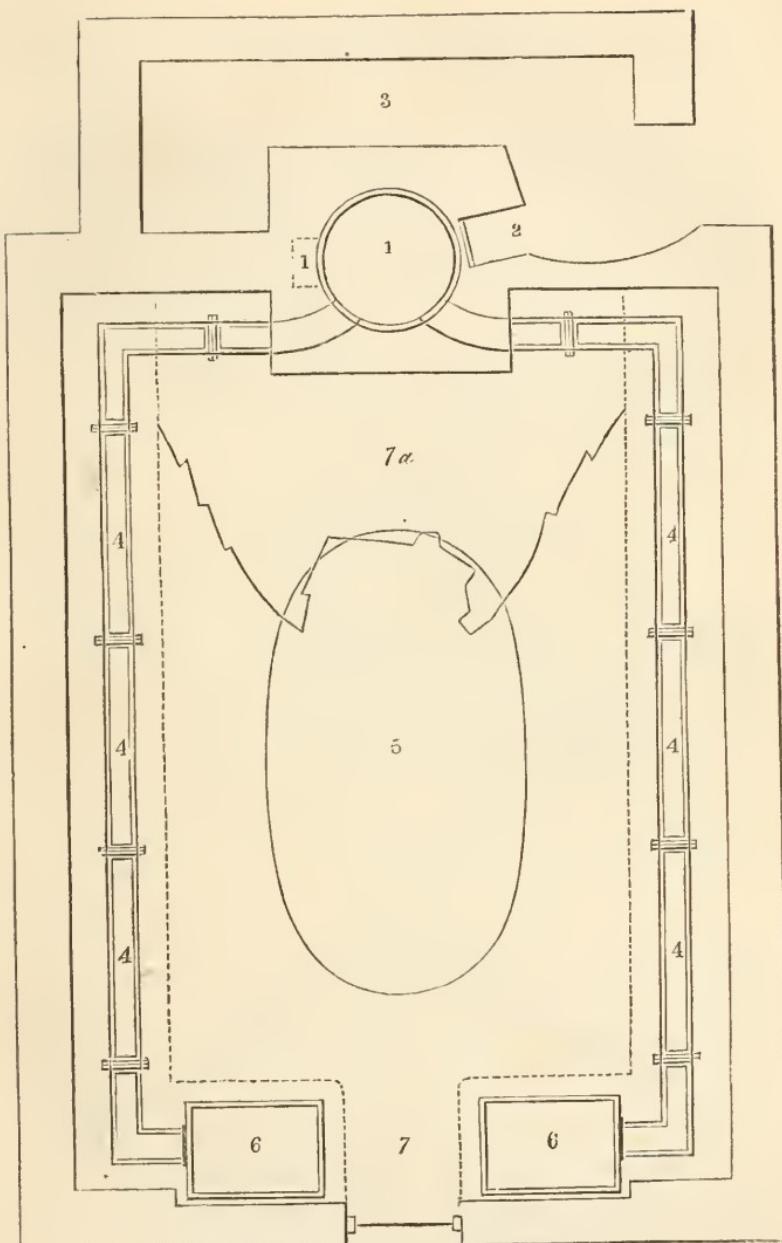
Plants that are grown in this manner have a wild luxuriance about them that is unknown to the specimens cultivated in the ordinary manner, and to myself they are exceedingly attractive, more resembling what one fancies them in their native forests—true air-plants, depending for their subsistence on the humid atmosphere alone.

Different species thus intermingle together in a beautiful confusion, *Dendrobium*, and *Camarotis*, and *Renanthera*, side by side, with wreaths of flowers and leaves interlacing one another, and sending their long roots to drink from the mist of the fall, or even from the water of the pool below.

Many species are cultivated upon the rocks themselves, others upon blocks of wood, or baskets suspended from the roof, and thus sufficient room is secured for a great number of plants. At the same time the general effect is beautiful, and the constant humidity kept up by the stream of falling water suits the constitution of many species in a degree that might be expected from a consideration of their native habits; and I would strongly recommend the adoption of this or some similar plan to all who have the means of diverting a stream of water from a level higher than the top of their stove.

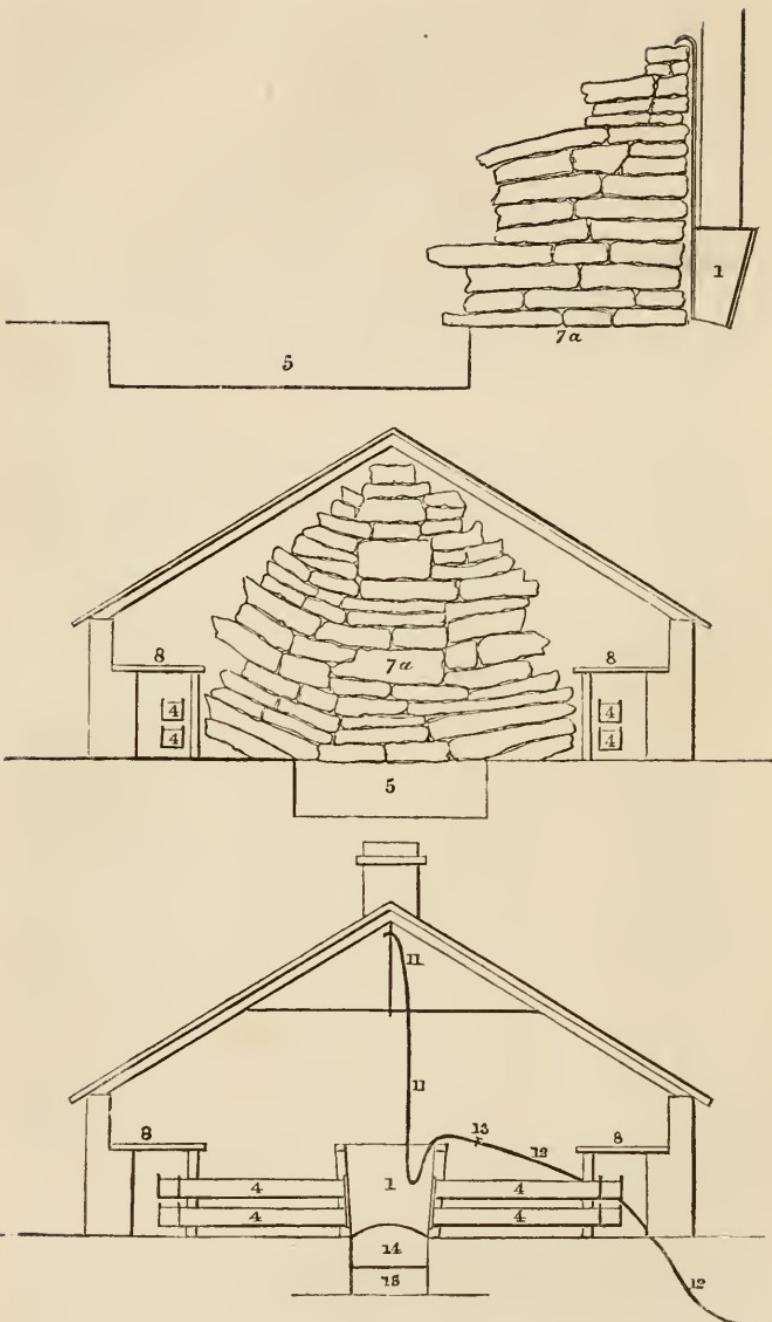
This, I think, in most situations might be easily contrived. My own house lies on high ground, and the water is brought from a considerable distance, but yet I found very little of difficulty or of expense in its construction; for it must be borne in mind that a small quantity of water is sufficient, and that this, after passing through the stove, might be conveniently used for garden purposes.

It must be remembered also that this plan may be added to any existing stove, and that the sole expense will be for the pipe to conduct the stream, and for the labour of the carriage and arrangement of the rock-work.



REFERENCE.

1. Boiler and flue. 2. Fireplace. 3. Coalshed. 4. Hot-water pipes. 5. Water tank. 6. Hot-water cisterns. 7. Doorway. 7a. Rock-work. 11. Pipe with hot water to fall over the rock-work. 12. Cold-water pipe. 13. Stop-cock. 14. Boiler. 15. Ash-pit.



II.—*Observations, Botanical and Physiological, on the Potato Murrain.* By the Rev. M. J. Berkeley, M.A., F.L.S.

Few subjects have attracted more attention, or have been more variously canvassed, than the malady with which Potatoes have been almost universally visited during the autumn of 1845. The press has teemed with notices the most contradictory; the attention of scientific men in every direction has been engaged by it; and three, at least, of the principal governments of Europe have issued commissions to examine into its etiology, and to discover, if possible, a remedy.

It is not indeed the first time that very serious disease has existed in this important article of food: more than half a century back, cultivators were much alarmed by a disease known under the name of the Curl, which committed at that time immense ravages, and is even now, especially in the North, a very formidable evil. It consists in a sudden check of growth in the young shoots, and, in consequence, a failure of produce. As is the case with so many diseases of plants, the cause is very imperfectly known.

In 1830 a disease was first noticed in Germany, called, from one of its leading features, the dry rot. For several successive years it was observed to increase in intensity, threatening to put an end to the cultivation of potatoes in the affected districts. The attention of the Bavarian Government especially was called to the subject, and Martius has published an admirable account of it.* The tubers, when stored for winter use or when planted, become impregnated with a kind of mould, and are at length so hard that they can scarcely be broken, and, instead of producing shoots, merely throw out a few small misshapen tubers. He attributes it to the growth of a peculiar fungus.

A somewhat similar disease, but differing in the circumstance that the tubers become soft instead of hard, has certainly been prevalent for many years without attracting much attention, and is probably more or less mixed up with the particular disease to which so much consideration has of late been paid. It is marked by the presence of parasitic fungi, which for the most part appear under the form of hemispherical masses bursting through the cuticle, and is referred by Fries to his genus *Periola*. The earliest record I am at present acquainted with of the existence of this genus is in 1815, in which year it was characterised by Fries,† for the plant of Tode,‡ to which he refers, published in 1790,

* Die Kartoffel-Epidemie. München, 1842.

† Fries, Obs. Myc., vol. i. p. 205. ‡ Fungi Meckl. Fasc. i. p. 6, 1790.

is, I think, clearly something different, occurring on the stalks, and not on the tubers. In this disease the tubers, though apparently healthy when stored, are rapidly destroyed by the fungus.

Another disease, arising from a very different fungus, is frequent, especially in calcareous districts, and is known commonly by the name of the scab, the surface of the potatoes being covered with pustules, which at length become cup-shaped, and are powdered within with an olive-yellow meal, consisting of the spores of a fungus. This also has been partially investigated by Martius, who has illustrated his observations with some characteristic figures.

Two other diseases are mentioned in the work of Martius, which are, however, so imperfectly known, that it is not necessary to notice them upon the present occasion.

In all the cases referred to above, the disease has either been confined principally to some one country, or, if more widely diffused, its effects have not been of such magnitude as to excite any general fears; whereas, in the present instance, the whole of Western Europe, from Norway to Bordeaux, seems almost equally to have suffered, and the ravages have not been less in Canada or the Northern parts of the United States of America. It is probable that it has existed for some time without attracting much attention: at any rate it is not the birth of one year only, as the advocates simply of atmospheric influence suppose. Dr. Morren* informs us in his admirable little pamphlet that it has been known for two or three years in Belgium. It appeared in the province of Liège in 1842, and on the 24th of March in the following year he laid before a large assembly of landowners its history, and the means of contending against it. Were this testimony by itself, we could not refuse to take it at the mouth of one who has paid so much attention to the subject, and is so intimately acquainted with all the phases of the disease. But the testimony is far from being solitary. In an excellent article in a Lille paper of the 26th of September, kindly forwarded to me by Monsieur Desmazières, it is stated that the disease of 1845 is identical with that which he described in a Memoir presented in the latter part of 1844 † to the Royal Society of Lille. The volume of the Transactions of that Society, even for 1843, has only just appeared; I applied therefore to the

* Instructions populaires sur les moyens de combattre et de détruire la maladie actuelle des Pommes de Terre. Bruxelles, 1845.

† The exact title of the Memoir is ‘Recherches sur l’altération observée dans le tubercule de la Pomme de Terre grise cultivée dans l’arrondissement de Lille en 1844.’

author for an abstract of his paper, which he sent me with his accustomed kindness. The disease was not observed when the potatoes were harvested, but appeared towards the end of the year. M. Desmazières considers it as certain that the malady was identical with that of 1845. As however he had no opportunity of examining all the appearances presented by the disease, and no traces of the peculiar mould which uniformly accompanies it, at least before the putrescence of the tubers was visible, though other fungi were very abundant, this case perhaps may not be thought quite so convincing as the former; or at least it may, with all deference to the excellent author, be surmised that it was greatly modified by the presence of a distinct disease in company with it.

Mr. J. E. Teschemacher,* in a letter to Mr. Colman, the Agricultural Commissioner from the State of Massachusetts, attributes the potato disease of 1844 to a fungus. This opinion was, I believe, more fully stated in a Memoir published at Boston, by the same author, for which Dr. Morren, in a letter dated October 25, refers me to the official reports of the United States, but to which, unfortunately, I have no access. Mr. Teschemacher indeed compares the fungus to the smut in corn; but taking other documents into consideration, it does not appear that this is to be interpreted rigidly. The disease, beyond all doubt, was very prevalent in Canada and the adjoining parts of the United States in 1844.†

The best account of the disease of Canada in 1844 is in a letter to Dr. Bellingham, which was read by him before the Dublin Natural History Society on the 14th of November, 1845, and published, together with much important matter from himself and Mr. W. Andrews, in ‘Saunders’s News Letter’ of November 17:—

“ During the months of July and August we had repeated and heavy showers, with oppressive heat, and an atmosphere strongly charged with electricity. Towards the close of the month of August I observed the leaves to be marked with black spots, as if ink had been sprinkled over them. They began to wither, emitting a peculiar offensive odour; and before a fortnight, the field which had been singularly luxuriant and almost rank became arid and dried up, as if by a severe frost. I had the potatoes dug out during the month of September, when about two-thirds were either positively rotten, partially decayed and swarming with worms, or spotted with brownish coloured patches, resembling flesh that had been frost-bitten. These parts

* Gardener’s Chronicle, 1845, p. 125. † Ib., p. 648.

were soft to the touch, and upon the decayed potatoes I observed a whitish substance like mould." This was clearly an aggravated form of the disease of 1845.

It is stated by Mr. Elliott,* of Florence Court, that the disease has been for the last three or four years prevalent in that part of Ireland; and Mr. Smeed, an eminent agriculturist of Bromston, near St. Peter's, in the Isle of Thanet, observed it in 1844.† It is not improbable that the disease which made its appearance in St. Helena, in 1844,‡ was really identical, and it is possible that the rust observed by Staudinger§ at Hamburgh some years since, was the same, if it be not rather referable to the disease mentioned by Martius under the name of Rust, which, though in some respects resembling that before us, differs too widely to allow of their being considered the same. It is impossible, indeed, to form any accurate judgment where the details are so imperfect and insufficient.

In a recent communication to the French Academy, Nov. 17, 1845, M. Boussingault states, on the information of M. Joachim Acosta, that the malady is well known in rainy years at Bogota, where the Indians live almost entirely on potatoes. They do not hesitate to use them, merely cutting off the affected part. M. Acosta believes that the disease has been always familiar to the Indians.||

It seems then clear, from the instances adduced, and others possibly may be found which have escaped my observation, that the disease cannot be considered as confined to the year 1845; and therefore, in endeavouring to ascertain its causes, it is absolutely imperative to keep this fact in view. The details are not indeed always sufficient, from the very nature of the case, for us to form a judgment from them ourselves; but putting all the information together, and properly estimating the parties from whom the evidence springs, we cannot fail to assent to their combined testimony.¶

The first notice of the disease in any of our own journals was by Dr. Bell Salter in the 'Gardener's Chronicle' for August 16,

* Gard. Chr. 1845, p. 674.

† Ib.

‡ Gard. Chr. 1844, p. 359.

§ Isis, 1832.

|| L'Institut, Nov. 19, 1845. This singularly confirms Dr. Morren's notion that the disease, like some other afflictions of the vegetable kingdom, is of American origin.

¶ The Brussels Commission, however, came to a different conclusion. See 'Rapport fait au Conseil Central de Salubrité Publique de Bruxelles sur la Maladie des Pommes de Terre, par M. Dieudonné, rapporteur.' They were, evidently, not in possession of all the evidence which has just been adduced. M. Durand, of Caen, does not consider the disease a new one.

p. 560, when it had become so prevalent in the Isle of Wight as to attract general notice and to excite great alarm. It had doubtless made its appearance some weeks previously, but probably not so early as in Belgium, where it was observed about the 10th of July, and on the 18th of August it had been so fully discussed that Dr. Morren, following the track of Dr. Van Oye and Mlle. Libert, published in the Belgian '*Indépendance*' of that date a very full account, and suggested remedial measures. If one of these had been followed generally, viz. removing at once the diseased haulm, it is, I think, most probable that we should have heard little more of the disease.*

A week after Dr. Bell Salter's first notice it was pretty general in the South of England, for on the 23rd of August few sound samples of potatoes were to be found in Covent Garden market, and Dr. Lindley had been able from personal observation to write the excellent article to which we shall presently have occasion to advert. The first public notice taken of the subject at Paris, as far as I can discover, was at the Société Philomathique on the 30th of August, when the subject was introduced by Dr. Montagne, a few days before any communication had been made at the Academy. Since this period up to the present time it has been the subject of constant investigation.

The disease then appears to have commenced in Belgium and to have radiated from thence, taking a gradual progress to the north and west, when it had become established in the south. On the 30th of August it was not known in the midland counties, though a few days after it was very general. It commenced in Ireland about the 7th of September, and somewhat later in Scotland. At the end of October Dr. Bell Salter informs us† that the disease was making its appearance in young plants.

Opinions of the most contrary description have been advanced respecting the cause of the disease, some attributing it entirely to the peculiar season, which, granting it to have been exactly such as the advocates of this notion assume, might more readily be admitted were it not certain that the malady has been prevalent even to a great extent in one season at least very different from that of 1845;‡ others refer it to electric influences, to

* The evidence indeed is somewhat contradictory on this point, but preponderates greatly in favour of the practice. The fact that diseased tubers occur sometimes before the haulm is much affected shows that it would not have entirely arrested the malady.

† *Gar. Chron.* 1845, p. 742.

‡ Up to the 28th of September the mean temperature of 1845 was nearly three degrees below that of 1844; the quantity of rain during the corresponding period of 1844 being scarcely more than half the average.

microscopic insects, to an epidemic resembling cholera, to the practice of raising potatoes constantly by division of the tubers, and especially from tubers cut in spring, to the use of animal manure, or to the degeneracy of the plant itself, but without any data upon which to found their assertions: others, again, to the influence of a parasitic fungus which first attacks the leaves and ultimately the tubers. Before reviewing these opinions it will be well to describe the phases exhibited by the disease, reserving to the end of the memoir the more purely botanical points connected with the subject. The chemical part of the question does not fall within my scope, and the remedial measures have been already exhibited in a form generally accessible to English readers in the reports of the Irish Commissioners.

The progress of the disease has been described in almost the same terms by all who have written on the subject. It was at first indeed believed by many that it began in the tubers and was propagated upwards, but every one seems pretty well convinced at present that the order of events is precisely contrary; for though it is true that in diseased fields a few scattered tubers, principally if not entirely such as chance to be superficial, may occasionally be found, or even a diseased tuber, on a plant whose leaves and stalks are apparently healthy,* yet these are quite exceptional cases, the general fact being that, at the time the foliage first becomes diseased, the tubers are healthy.

The potato crops up to a certain time were very luxuriant, as testified indeed by the produce in spite of the premature decay of the organs on which of course the perfection of the crop depends. This was especially the case with the crops which were attacked in Canada in 1844, and Dr. Bellingham informs us that in Ireland there was "a luxuriance of the leaves, flowers, and stalks, which led most people to suppose that there would be an unusual yield." The luxuriance perhaps indicated the latent disease in accordance with the phenomena presented by corn affected by cereal fungi.† The leaves then began suddenly to assume a paler and at length a yellowish tint, exhibiting here and there discoloured spots, and, if I mistake not, were less copiously clothed than usual with pubescence on the under surface. More or less exactly coinciding with these spots on the reverse

* *Revue Botanique*, 1845, p. 150.

† It is well known that the presence of the mycelium of fungi acts as a stimulant to the chlorophyl: witness the rich tint of fairy rings. A curious instance has within a few days fallen under my notice. The hazel leaves a week or two back were very generally spotted with dark patches of green. On examination it was found that the reverse of such patches was covered with *Erysiphe guttata*, which had been living at the expense of the paler portions of the leaf, while in the superjacent patch the chlorophyl had become of a deeper green.

of the leaves appeared white mealy patches, consisting of a minute mould proceeding, either singly or in fascicles, from the stomata, and arising from an abundant branched mycelium creeping in every direction through the loose tissue beneath the cuticle. The upper surface rarely if ever exhibits the mould, it being almost physically impossible for its delicate threads to penetrate the closely packed cells which, being arranged side by side, leave scarcely any intercellular passages. The mould in a few hours from its first piercing the apertures of the stomata perfects its fruit, and in so doing completely exhausts its matrix, which in consequence withers. No sooner have a number of the leaves been attacked than the stem itself is subject to change, becoming spotted here and there with dark brown patches in which the cells are mostly filled with a dark grumous mass, without exhibiting any mucinous filaments, though occasionally, as in a portion figured, I have ascertained their presence. Very rarely fructifying but dwarfed specimens of the mould occur upon it. I have figured such, as sent to me from the neighbourhood of Bristol by Mr. Broome. The stem now rapidly putrifies, the cuticle and its subjacent tissue becoming pulpy, and separating when touched from the woody parts beneath. The whole soon dries up, and, in many instances, exhibits in the centre the black irregular fungoid masses which are known under the name of *Sclerotium varium*,* and which are believed by the most competent authorities to be the mycelium of certain moulds in a high state of condensation.

If the tubers are now examined, the greater part will often be found smaller than usual, especially if the disease has commenced at an early stage of growth, but in their natural condition, while here and there a tuber, particularly if it has chanced to be partially exposed, exhibits traces of disease. The surface is, however, soon marked with livid patches, commencing generally about the eyes, or at the point of connection with the fructifying shoots, according to Payen and Phillips; these rapidly acquire a spotted appearance, the spots being rather waved, and assuming often a more or less concentric arrangement. Sometimes, especially on the smoother kinds of tuber, two or more regular systems of concentric spots are exhibited on the same tuber. The skin now withers, and is easily separated; the spots become depressed, and of a yellowish tinge; and if the tubers be laid in a moist place, in a day or two—sometimes in the space of a few hours—

* This has been the case very generally. I have received specimens from Mr. J. D. C. Sowerby, procured near London; from Suffolk by Professor Henslow; from Dumfrieshire by Sir W. Jardine; and from Elgin by Mr. Robert Arthur, who communicated them to the London Horticultural Society.

the same mould which destroyed the leaves springs from them, piercing the cuticle from within, yet not scattered, as on the leaves, but forming a conspicuous white tuft. If a section of the diseased tuber be made on the first symptoms of the disease, little brownish or rusty specks are found in the cellular tissue, confined, with very rare exceptions, to the space between the cuticle and the sac, if I may so call it, of spiral vessels and their accompanying tissue, which, springing from the subterranean branches, pass into the tuber, making their way to the several buds disposed on the surface. The disease, I believe, commences in the mother cells of the fecula, and not in the empty subcuticular cells, or in the cuticle itself, though the contrary has frequently been stated. These spots consist at first of a quantity of discoloured cells mixed more or less with others in a healthy condition. The walls are tinged with brown, and sprinkled both within and without with extremely minute inorganic granules, which Monsieur Decaisne* has found to resist the action even of concentrated boiling muriatic acid. The grains of fecula, which are themselves sometimes powdered with the brown bodies, are for a long time perfectly healthy, without any laceration of their walls or change of colour, and are never, as in the disease of Martius, rough with incipient fungi. The cells themselves, so far from being looser, are more closely bound together than in the more healthy portions. In general, no traces of mycelium are visible in this stage, but I have found in the midst of the patches in some of the cells, usually in those less diseased, young plants of mould springing from the walls within, exactly as Martius† has figured the incipient Fusarium in the disease which he has called Dry Rot. The processes on the cells, which Payen took for mycelium, exist not only on the diseased cells or on the sounder cells of the diseased tubers, but I have found them also in potatoes of 1844, and in tubers produced from them in the cellar; and there appears to be something analogous on the mother cells of other plants, as in those of the tulip and Arum maculatum. Their resemblance, however, to mycelium, from their mode of growth, and occasionally somewhat dichotomous habit, is so strong that it is very difficult to divest oneself of the notion that they are really of a mucidinous character, especially when Payen's chemical analysis, corresponding so closely with that of fungi, is taken into consideration.‡ The rusty spots soon exhibit a darker tint, spreading in every di-

* Revue Botanique, 1845, p. 161.

† Martius, Die Kartoffel-Epidemie, Tab. 3, fig. 18, 21.

‡ In the supposed fungous substance he found 9·75 per cent. of azote, while mushrooms from the bed contain 9·78.

rection, and becoming confluent; they at length extend beyond the barrier of vascular tissue, and attack the central mass. The tuber, meanwhile, assumes a disagreeable smell, decomposes more or less rapidly, other fungi establish themselves on the surface, or in the decaying mass, which emits a highly foetid odour resembling that of decaying agarics, the union of the cells is dissolved, animalecules or mites make their appearance, till at last the whole becomes a loathsome mass of putrescence. The eyes* are usually the last part destroyed, from the disease being peculiar to the cellular tissue, and not very readily spreading beyond it: and, in consequence, extremely decayed tubers will, when planted, vegetate and produce healthy shoots, which support themselves as the decay of the mother plant proceeds by their own roots.† Meanwhile, the traces of mycelium are sometimes more evident, though often extremely obscure: but the walls of the cells, when divided, often take so tortuous a course, assume so many forms, and are so confused by the brown granules, that it is extremely difficult to distinguish any mycelium from them, and no appearance can implicitly be trusted, except when the threads are seen to float freely on the edge of the portion examined; and even where this has been satisfactorily ascertained in a portion of a slice taken immediately below one of the tufts of mould, it is very difficult to perceive it on another. Indeed, on examining the diseased spots on the smooth surface of a divided potato which had given rise to an abundant harvest of the Botrytis, though the mycelium was clear enough at the edge of a thin slice, it was almost impossible to trace it farther, from the confusion caused by the various septa, either divided by the lancet, or seen through the superincumbent tissue. I have seen one case only in which the spots did not give rise in the first instance to the peculiar mould; but this was in a specimen already highly diseased and partially putrescent. In an earlier stage of the disease the Botrytis is uniformly produced, and at the time of writing these notes (Nov. 22nd) I cannot find, in my potatoes which have been kept dry, any other species of mould except on portions injured by the fork, which exhibit some of the commoner species, and on parts which have been

* The eyes of the decayed tubers often show a remarkable tendency to shoot. I believe this is the case principally in such specimens as have been exposed to light.

† It remains to be seen what will be the ultimate condition of these plants. I do not apprehend that the decayed tuber beneath will injure the plants when they are once established; but the shoots if not produced rapidly sometimes fail, partly, as it should seem, by immediate imbibition of diseased juices, partly from the contiguity of diseased matter. See 'Gardener's Chron.', 1845, p. 768, c., for some observations bearing on this subject.

bruised, on which there is a minute mucor. It is plain, that at a late period of the disease, when other fungi have been established, and on breaking the tuber mucedinous patches are visible within, all traces of the original parasite may easily be lost. But even in this state it should seem that there is some difficulty occasionally in tracing any mycelium amongst the cells, as Monsieur Desmazières, a most practised microscopic observer, had not, even so late as the 17th of January—though the tubers he examined were eaten up with a *Fusarium*—been able to detect any mycelium.

The order of phenomena described above is such as to show a very intimate connection between the parasite and the disease. Accordingly, the notion that the disease is the effect of the parasite has met with some advocates, especially in Belgium. Monsieur Payen also, to a greater or less extent, accords with Dr. Morren: and, after an attentive consideration of the progress of the disease and of almost everything of value that has been written on the subject, and after duly weighing the peculiar difficulties with which it is attended, I must candidly confess, that with a becoming share of philosophic doubt where such authorities are ranged upon the opposite side,* I believe the fungal theory to be the true one. I cannot claim the support here of my friend Dr. Montagne, though he has been imagined by some of his colleagues to accord in opinion with Dr. Morren; but in the very first communication I had from him upon the subject he expressly stated his doubts as to the true cause of the disease, though at the same time he admitted its intimate connection with parasitic fungi.

To avoid going twice over the same ground, it will be convenient to consider first the other opinions which have been brought forward.

The principal advocates of the opinion that the disease is in the first instance independent of parasitic fungi, and that it arises from the peculiar atmospheric conditions of the season, are the members of the Brussels and Groningen Commissions; Dr. George, Dr. Vallez, and De Potter, in Belgium; Bouchardat,

* Monsieur Duchartre, in the 'Revue Botanique,' 1845, p. 177, states that I have modified the notions which I at first entertained of the *Botrytis* being the cause of the disease, founding this assertion on my correspondence with Dr. Montagne. There is certainly some mistake in this. I may have expressed myself as open to conviction, and acknowledged, as I still do, the difficulties of the case; but at present I have certainly seen no reason to depart from the opinion I formed from the moment I had an opportunity of examining the matter for myself. My first communication to the 'Gardener's Chronicle' was made before I had an opportunity of seeing the disease *in situ*.

Decaisne, Desmazières, Duchartre, Morren of Rennes; Philipp and Pouchet in France; Drs. Kützing and Munter, in Germany; and in the British dominions, Drs. Kane, Playfair, and Lindley, Dr. Bellingham, Mr. W. Andrews, and Mr. G. Phillips. The matter is differently expressed by different parties: some speaking principally of excessive moisture; others of alternations of heat and moisture; others of the peculiar electric phenomena; and all, more or less, of the surcharge of the cellular tissue with moisture. It will not be necessary to examine the views of each separately, because they all tend essentially to the same point. Those of M. Decaisne, unfortunately, have at present only been partially stated. I regret much that his memoir will not appear until these observations are in the printer's hands.

Dr. Lindley stated the matter very clearly in the 'Gardener's Chronicle' for August 23, in a passage which I proceed to copy. It is to be remembered that it was written at an early stage of the inquiry, but his views have suffered scarcely any alteration, notwithstanding the great attention he has since given to the subject.

"The cause of this calamity is, we think, clearly traceable to the season. During all the first weeks of August the temperature has been cold, from two to three degrees below the average—we have had incessant rain and no sunshine.

"The potato absorbs a very large quantity of water. Its whole construction is framed with a view to its doing so; and its broad succulent leaves are provided in order to enable it to part with its water. But a low temperature is unfavourable to the motion of the fluids or to the action of the cells of the plant; and, moreover, sunlight is required in order to enable the water sent into the leaves to be perspired. In feeble light the amount of perspiration from a plant is comparatively small; in bright sunshine it is copious: in fact the amount of perspiration is in exact proportion to the quantity of light that falls upon the leaf. At night or in darkness there is no appreciable action of this kind. During the present season all this important class of functions has been deranged. The potatoes have been compelled to absorb an unusual quantity of water; the lowness of temperature has prevented their digesting it, and the absence of sunlight has rendered it impossible for them to get rid of it by perspiration. Under these circumstances it necessarily stagnated in the interior; and the inevitable result was rot, for a reason to be presently explained. If the first days of July had not been suddenly hot, it would not have happened; and perhaps it would not have occurred had the temperature been high instead of low, even although the sun did not shine and rain fell incessantly.

It is the combination of untoward circumstances that has done the mischief."

"It may be urged perhaps, in opposition to this explanation, that potatoes thrive very well in districts whose summers are usually as unfavourable as this has been; as for example the cold parts of Scotland. And that is doubtless true. But in those climates the potato grows slowly, its tissue becomes thoroughly organized as it proceeds, and it is not liable to be acted upon by accumulated moisture. There no predisposing cause exists. But in England the potato was predisposed to take the disease which is destroying it by the unusual warmth of the beginning of July suddenly succeeding a period of cold, ungenial weather; at that time the temperature of the soil near London was between 60° and 68°; the potatoes grew excessively fast, their tissue was soft and unconsolidated, filled with azotized matter, as all such tissue always is, and peculiarly liable to run into a state of rottenness."

The most complete statement after this is in a pamphlet by Dr. Vallez and De Potter. I have not been able to procure the original pamphlet, but, by the kindness of Messrs. Desmazières and Decaisne, I have received extracts from the '*Moniteur Belge*' of the 29th of August, and the Belgian '*Précursor*' of the 16th of September, 1845, which contain, evidently, the most important portions of the pamphlet. It will be well to give an abstract, as the matter is stated somewhat differently by these authors.

The earth at the commencement of June, they say, in consequence of its dryness and the extreme heat with which it was inundated, its low conducting powers and its negative state of electricity, was necessarily a bad reservoir or general recipient of the fluids just mentioned.

The air, from want of rain, was also a bad conductor, and was, in consequence, surcharged with electricity; but great storms suddenly took place: whilst the air got rid of its excess of electricity, and became, from its humidity, a better conductor, the soil, from being a recipient of the moisture, was in a different condition. It constituted a superficial sponge, in which all the electricity contained in the air was absorbed, producing in it a more violent action, and exciting a sudden and great increase of heat. In consequence of this condition, the tubers became suddenly gorged with moisture, and the prey of putrefaction.

In whatever terms, in fact, from differences of climate or of personal views, the matter may be stated, the exciting cause of the decay is by all considered excess of moisture combined more or less with heat, or electric agency. In addition to the

causes mentioned by Dr. Lindley as producing the putrefaction of the stems, even if it be not considered as the immediate cause, the *Botrytis* would be concurrent in preventing the perspiration of the excess of moisture. For not only does the mycelium block up in great measure the loose tissue which gives a passage to the fluid, but more or less completely the stomata also by which the vapour passes.

As regards electric phenomena, though they are known to have a most important influence on the production of fungi, it is far from clear that they have much effect on phænogamous plants. The experiments lately made on the influence of electricity on vegetation seem to show that it is very small.

Besides the objection stated by Dr. Lindley as capable of being brought forward against his views, it may be urged that the fact of the disease not being peculiar to the year 1845, but having been excessively destructive in 1844, and more or less so in preceding years, greatly militates against the notion of its being due to the peculiar season. For it cannot be asserted that there was much similarity between 1844 and 1845. And, taking the experience merely of 1845, and the various times at which the disease made its appearance in different parts of the country, the same conditions did not exist in all cases. In many districts it made its appearance during the very dry weather at the end of August and beginning of September. Besides, it does not appear that differences of soil have had much weight in the progress of the disease. In many districts it has been found that the potatoes in the driest soils have been affected most. In the fens* of Cambridgeshire it has been observed generally that those spots in which the water was not perfectly drained, suffered much the least, and similar accounts have been received from other quarters.

I think, too, it may be doubted whether the season, though extremely cold and ungenial, has really been more wet than usual.† Dr. Bell Salter, in a late number of the '*Gardener's Chronicle*', writes as follows from the Isle of Wight:—“In this

* It perhaps may be objected here that the water being impregnated with peat, acted as a preservative. The experience, however, of various districts shows that the peculiar nature of the soil had, in general, little influence on the disease. No districts suffered more than the dry parts of the fens.

† It appears from observations made at Chiswick, as reported in the '*Annals of Natural History*', that the quantity of rain from May to September inclusive was below the average of the last eight years: the average quantity of rain during those months being 11.20 inches; while during the same period in 1845 it was 11.12. Neither was the rain in any one month greatly above the average.

	May.	June.	July.	August.	September.
Average of Eight Years	2.02	2.26	2.10	2.26	2.52
1845	2.89	1.36	2.31	2.79	1.77

place, where the disease appeared so early, and where indeed it has been so severe, it does not appear to depend on free moisture to the extent which is your opinion of the matter. In the districts of the porous greensand formation, which have generally yielded our best crops, they have this year suffered the most; while in the cold, wet districts of the London clay, and beds of plastic clay, and upper fresh-water formations, the crops have been much less attacked. In one instance, in a clay soil, and where the air had not been admitted by hoeing up, the potatoes were almost unattacked. From all I can collect in this district, exclusion of air appears to have been the greatest preservative, either by depth of planting or even by agency of free moisture on the surface. Though there has been so little duration, at any time during the summer, of weather free from rain, yet the actual quantity of water which has fallen has been much less than usual. Our springs have been very low, and during the harvest period, when fortunately there was a short continuance of dry weather, the effects of drought were most speedily visible."

It may be doubted, too, whether the water of vegetation has always existed in the tubers in a greater proportion than usual. The quantity of water in potatoes is stated by Boussingault as ranging from 75·9 to 79·4 per cent.; according to Payen it is somewhat lower. My own observations do not show any excess of moisture in potatoes taken from the ground in the month of October, the crop being in an extremely diseased state. They exhibited 74 per cent., the central substance of the tubers giving 73·5. Potatoes, from a cellar at the same time, in good condition, gave 77·1. Mr. G. Phillips found on the 2nd of October 75·7 in a sound potato taken from the ground. In another variety he found 78·0, and in a diseased white potato 79.* The potatoes, after they become diseased, probably when placed in a moist situation, imbibe a certain quantity of moisture.

Did the disease really arise from the water of vegetation existing in too great abundance, and hence inducing putrefaction of the cellular substance, it would be difficult to say why it has not existed to a considerable extent before. This spotted form of decay is certainly not familiar to the cultivator, however long it may have existed, though other forms are.

I think then it is at least plain that no supposed peculiarities of season are sufficient without some more specific cause to account for the general prevalence of this disease.

* Monsieur Stas however asserts that all the potatoes of this year contain less water and starch and more coagulable albumen than usual. He states the water at 82·2. (*Comptes Rendus*, 1845, p. 691.)

Some have attempted to account for it by the notion that in consequence of long culture, and from the practice of raising plants from cuttings, not from seed, the species is exhausted and incapable of producing healthy offspring. But this depends upon mere theory, it being more than doubtful whether any species or variety does really become exhausted by long culture or by the practice of using cuttings, however popular the notion may be; and were the notion well grounded, whether its degeneracy would produce, and that so suddenly and universally, the effects attributed to it; and the fact that the newest seedling varieties have suffered* quite as much as the old ones at once overthrows this theory. Others again have attributed it to over-manuring and the use of guano. But this is contradicted by the fact that all soils were subject to the disease, however poor or rich, and whatever the nature of the manure might be with which the land had been prepared.

It has also been conceived that the disease is a sort of epidemic analogous to cholera, arising from some pestilent emanation or specific poison in the atmosphere affecting the health of the plant. Others again affirm that it is due to microscopic insects wafted by the air. M. Gruby goes beyond the rest, and sees three causes at work at the same time—a parasitic insect, a specific disease, and a parasitic fungus. These conjectures however, it is obvious, are not supported by facts, and cannot be adopted provided other more tangible causes can be assigned with any degree of probability.

We come now to the theory which has been so much canvassed, and which is now peculiar almost to Dr. Morren, unless M. Payen is to be reckoned also as its advocate. Of this opinion, notwithstanding the opposition, and in some instances the ridicule almost, with which it has been assailed, I must, as said above, profess myself at present. I do not mean to say that there are no difficulties in the case, or that weighty objections may not be raised, but I think that these difficulties have been exaggerated, while in other instances the exact question has not been understood. It is agreed that the disease commences in the leaves; and in those instances where the mould has not been observed, it is probable that the decayed foliage was examined too late. In a few hours the fungus has run its course, and in a week or so the greater portion of a field is laid waste so as to make it difficult to get specimens for examination. The decay is the consequence of the presence of the mould, and not the mould of the decay. It is not the habit of the allied species to prey on decayed or decaying

* See especially Gard. Chron. 1845, p. 768, where this part of the subject is admirably discussed.

matter, but to produce decay—a fact which is of the first importance. Though so many other species have this habit, these have not. The plant then becomes unhealthy in consequence of the presence of the mould, which feeds upon its juices and prevents the elaboration of nutritive sap in the leaves, while it obstructs the admission of air and the emission of perspiration. The stem is thus overcharged with moisture and eventually rots, while every source of nutriment is cut off from the half-ripe tubers. It would be as reasonable to say, with our knowledge of the nature and habits of the cereal fungi, that bunt, or mildew, or the other allied diseases which affect corn, are the consequence and not the causes of disease. In favourable seasons they are not developed; in unfavourable seasons they spread like wildfire: in one sense, therefore, the atmospheric conditions are the cause, but merely as they stimulate into action the latent pest. The immediate cause of disease is the fungus which preys upon the tissues of the corn. So exactly, in the present instance, as far at least as the aerial portions of the plant are concerned, the *Botrytis* is the immediate cause of destruction. In some instances it may have been aided by unseasonable frost, but this has certainly not always been the case. The mould indeed would not have spread but from peculiar atmospheric conditions favourable to its growth. What these are it may be impossible to say, but it is a fact well known to every student of the extensive tribe of Fungi, that their growth, and especially their numbers, depend more than all other vegetables on atmospherical conditions, or what Fries has happily called “cosmica momenta.” Even the peasant knows this to be the case with mushrooms. Dry and wet summers occur, and both are equally barren; while in other seasons, apparently but little dissimilar, they occur in the utmost profusion. A species will be most abundant for a year or two, and then for a period vanish entirely. It is notorious that this is the case in other parts of the creation, especially amongst insects, peculiar species of which sometimes swarm to such an extent as to baffle the naturalist. In the summer of 1826, for instance, *Vanessa cardui* existed in the greatest profusion in England, and it was traced by Mr. A. Way from England to Nice. The species of late years has been comparatively rare. There is nothing surprising then in the fact of the immense prevalence of a parasitic mould. No one wonders when the hop-grounds are ravaged by their peculiar mildew, because the cultivation of hops is so limited; but if it were as universal and of as much importance as potatoes, the ravages would equally excite attention. It is by these instruments, contemptible in the sight of man, that the Almighty is pleased sometimes to accomplish his ends. Instances, like that of the Hessian fly, will readily occur of the immense disproportion between the means and the end.

The peculiar habit of the species, as said above, contradicts the notion of its appearance being the consequence of decay. I have in vain tried to make the spores vegetate, as is so easily done with other species. The spores of *Botrytis Bassiana*, which destroys the silkworms, and certainly is not the consequence, but the cause of decay, because the disease is readily communicated to the most healthy caterpillars even of other species, vegetate readily* upon various substances. I do not assert that others may not have better success; but at present, in whatever way I have tried them, I have not been able to get a single spore to sprout, much less to propagate them upon foreign bodies. I do not know of any single instance in which any of the nearly allied species have been found in any other situation than growing from the tissues of plants; were this ever the case, they could not have been overlooked, as their spores are so much larger than those of other species of the genus. *Botrytis cana* is the only species which approaches them in this respect, but it is distinguished at once by its cinereous floccæ and its evident relationship to *B. vulgaris*. The species are in fact as peculiar to the living tissues of plants as are the several species of *Puccinia* and *Uredo*, which could not exist, or at any rate be perfected, elsewhere. The mycelium of the cereal fungi is known to exist from the earliest period in corn, and is perfected only under favourable circumstances; and there is every reason to believe that the case is the same with these essential parasites, which certainly do not thrive on putrescent matter, but cause the decay of the matter on which they thrive. The direct observations of Bauer, Corda, and Léveillé, prove merely what a thousand facts indicate, unless, indeed, we have recourse to the notions entertained by many of spontaneous or equivocal generation from languid or diseased tissues; for the question at last reduces itself to this, which is indeed one involved in mystery, but which, as far as I can judge, wherever the veil is partially lifted up, seems after all to point to the same general laws by which the higher portions of the creation are governed.

To my own apprehension, then, it appears clear at least that the cause of the premature decay and putrefaction of the haulm is to be found in the parasitic fungus, in consequence of whose attacks the tubers are unripe, and in a bad condition for preservation.† Under these circumstances, if decay takes place, there cannot be much matter of surprise; and that, as in all cases of decay,

* See Ann. des Sci. Nat., vol. 8, p. 257; vol. 9, p. 1, &c. Dr. Montagne has made the spores sprout between two plates of glass.

† Some persons were inclined to attribute the premature decay, as said above, to frost; but, as the Abbé Michot remarks, "Balsams, dahlias, and other plants susceptible of cold did not suffer."—Rev. Bot., 1845, p. 156.

various species of fungi should establish themselves upon the tubers and accelerate it. It is well known, without having recourse to the curious observations of Dr. Nägeli,* that various fungi do exist in the tissues of plants, accelerating their decomposition. A very singular species will be described at the end of this memoir. Facts of this kind, whether we observe them or not, are daily before our eyes, and there would be little difficulty in admitting that the decay of the tubers was produced by natural decomposition arising from their imperfect organization, the tubers being unhealthy from various outward circumstances and from the premature decay of the haulm, but for the curious fact that the same mould which springs from the substance of the leaves, uniformly bursts forth from the tubers exactly at the very spots where the decay originates. That the mould proceeds from within I can assert from personal observation, and believe it to be a fact that it could not establish itself on a decayed substance; nor, indeed, have my experiments been successful as regards sound tubers. Portions of the mould transferred to healthy tubers placed in favourable situations for its growth have remained precisely in the same condition, without establishing themselves in their new situation, and inoculation has not at present been attended with any positive result. It should seem certain, then, that the mycelium or elements of the fungus must have pre-existed in the tuber; and as it uniformly springs from the decayed spots, that it has itself caused the decay.

But here a difficulty arises from the great obscurity, or as some say, the total absence of mycelium in an early stage of the disease. I have satisfied myself however of its existence in some cases, but not uniformly. Another difficulty arises from the fact that diseased tubers are found occasionally on plants whose foliage is untouched,† or only slightly affected by the mould. The disease in this case at least does not arise from the deterioration of the tuber from the decay of the foliage. But if, previous to the breaking out of the mould from the leaf, the cellular tissue is impregnated with mycelium, a fact which I have had no opportunity of ascertaining since my observations were commenced, it is possible enough that it may be present in the tubers which are leafless branches, and if so, it may exercise its influence on the tuber before it bursts forth from the leaf. And if these observations be well grounded, the case is merely an exceptional one. In those cases in which I have myself found diseased tubers while the foliage was still more or less

* *Linnæa*, vol. 16, p. 237.

† Decaisne, *Rev. Bot.*, 1845, p. 150.

perfect, they have always been superficial and partially greened by exposure to light.

The disease, however, is in general subsequent to the decay of the haulm. Now, even granting that no visible mycelium is present in the decayed spots when first exhibited, I cannot grant, taking the ascertained facts into account, that they are independent of the fungi. For without having recourse to the notion of the juices of the plant in general being vivified by the fungi on the leaves which, indeed, is not consistent with the case just mentioned as brought forward by Decaisne, and if it were, leads at once to the question of the production of the fungus from diseased matter without pre-existent germs, it seems to me most certain, from observation of those fungi which grow from the tissues of plants, that minute particles, too small to be distinguished by the highest powers of the microscope, must be carried about with the juices, and when fitting circumstances concur, proceed to act upon the tissue with which they are in contact.* That under certain circumstances foreign particles should produce disturbance of the system is not more surprising than that a moment's breathing an infected atmosphere or the least particle of virus taken up by the absorbents in the human frame should produce such extensive mischief, while in other cases constant exposure to the malaria and more thorough inoculation prove absolutely harmless. That the mould in the tubers should commence by producing decay, contrary to its presumed habits in the foliage, is not so curious as that under such anomalous circumstances the mould should be produced at all. I can see, on mature reflection and consideration of all the difficulties of the case as far as they occur to me, nothing at all absurd in Dr. Morren's views, in which if there be difficulties not solvable at present, there are at least as great difficulties on the other side.

A somewhat analogous decay is now attacking Swedish turnips, commencing in little sinuous lines, which follow the course of the scalariform vessels, around which dark granules are deposited somewhat after the fashion of those in the potato cells. It is curious that in extensive fields the foliage is to a very great extent destroyed by *Botrytis parasitica*, a nearly allied species.

* It is well known that bunt is communicable by rubbing sound grain with the spores of the fungus. It does not seem to have been ascertained at present how the spores act: whether they vegetate on the surface, and send their mycelium into the tissue of the young plant, or whether the contents of the spores are imbibed. The usual mode of germination in fungi is a protrusion of the membrane of the spore; but it is very probable that the minute contents of the spore or its protruded shoot, when absorbed and circulating with the juices, would produce the perfect fungus under favourable circumstances. The spores themselves could not enter the stomata.

The fact that the earliest potatoes, which had cold and wet weather enough to contend against, were not attacked, is much in favour of the fungal theory, the foliage never having suffered. The second crops suffered perhaps nearly as much as the later—in some cases more so.

The circumstance of the concentric arrangement of the spots in certain cases appears to me of great importance, as indicating their origin from a fungus. I regret much having searched in vain for fresh specimens of *Oidium fructigenum*, the species on which Ehrenberg made his observations on the growth of fungi, with a view to ascertain the condition of the mycelium. As the texture of the matrix, however, is so loose, it would be probable that it would be freely developed, as is the case with that which is so abundant in the ordinary decayed spots of pears and apples.

The reports are so contradictory as regards the subject of contagion, that it is impossible to build anything upon them.* Some deny the fact altogether, while others say that a single diseased tuber is sufficient to infect a thousand. When it is considered that apparently sound tubers will, even though exposed to light and kept dry, in a few days exhibit the disease, and that in a moist place the change takes place more certainly, be the selection as careful as it may, it appears clear that no experiment of sprinkling them with the water in which diseased individuals have been boiled, or confining them within the same atmosphere, or even of placing apparently sound individuals in contact with unsound, can be conclusive. I have seen no evidences of contagion in the experiments I have myself instituted.

Were a single fungus only produced upon the tubers, viz., that which grows upon the leaves, there would be less difficulty, I believe, in admitting the agency of the *Botrytis*. The difficulty is, I think, however, overrated : when it is considered how extensively—nay, universally—moulds are produced in decaying matter, and how many species occur upon one putrescent mass, it will not seem so wonderful that when the *Botrytis* has superinduced decay, other species should follow in its wake. If the peculiar spots, in the first instance, were found on extensive trial to produce indifferently a variety of species, the case would be different ; but if, as I believe, the *Botrytis* always precedes when the trial is sufficiently early, the conclusion is evident.

Before closing this part of my subject it may be well to mention an observation which I made during the course of my investigation. On examining the cuticular cells of a young tuber, with a view to ascertain the changes which occur in the process

* Payen thinks it not contagious : Morren, on the contrary, contagious.

of greening, I found evident traces of mycelium within them. Little attention was paid to the circumstance at the time, though I made a sketch of the appearance, which will be found amongst the figures. The potato was then exposed to the light and sun in the window of my study, the weather being dry, when, to my great surprise, in a few days it exhibited the spots peculiar to the disease, and was, in a few days more, completely decayed. I am not at all certain that the mycelium was connected with the spots, but the circumstance seems worth recording.

The disease, if it be due to any specific cause, which I think is clear, however obscure that cause may be, can scarcely be expected, after having had so extensive a range, to subside all at once. The same atmospheric conditions which have favoured its progress are not likely to occur again; but still I fear that it will be felt directly or indirectly for some time, as in the human frame the general prevalence of a particular disease modifies other diseases for many successive seasons. Such, I am assured by one of the most intelligent practitioners in England, and than whom no one has paid more attention to the particular disease or been more successful in its treatment, has been the effect of cholera in a large town where it was extremely prevalent. Diseases appear under a new type and require a different treatment. A diseased stock can scarcely be expected to produce a perfectly healthy offspring.

On the supposition that it springs from some contagious matter, we can form no probable conjecture, except by mere analogy; but if it arises from a parasitic fungus, it may be hoped from our experience of other productions belonging to the same tribe, that succeeding conditions of the atmosphere may be more or less unfavourable to its development, for it is most certain that the germs of cryptogamic plants may be present in tissues and yet remain more or less inert, unless peculiar circumstances should concur—exactly as the seeds of phænogamous plants may lie dormant in the earth for centuries.

The Irish Commissioners have wisely taken a wide view of the subject in their reports, and in a case of such difficulty it is seldom safe to trust entirely to one's own particular views. The safest and the best plan on every account is to keep our minds in a condition to meet the subject, should it unhappily obtrude itself again upon the attention of the public, without prejudice, and we shall then have some prospect of discovering the proper remedies.

I come now to the more purely botanical part of the question, namely, the description of the parasite which has been so constant an attendant on the disease. And here, as if no part of the matter were to be free from debate, a little difficulty presents

itself in the outset as regards the name. The mould has been severally named by Monsieur Desmazières, Dr. Montagne, and Mlle. Libert. There is no question, I think, as regards the first; but Dr. Morren, in a paper published in the Transactions of the Royal Society of Gand,* claims the priority for Mlle. Libert. Unfortunately he does not state in what work that excellent mycologist had characterised the species previously to the public notice made by Dr. Montagne before the Société Philomathique of Paris, on the 30th of August. The very reason which induced him so to do, was that in Dr. Morren's Memoir, in the Belgian Indépendance of the 18th of August, no specific name was assigned. It appears indeed from M. Duchartre's Memoir,† that Mlle. Libert was the first to publish the opinion of Dr. Van Oye, in L'Organe de Flandres; but whether the species is there characterised or not I am unable to say. But even supposing such to be the case, it can scarcely be deemed a publication within the meaning of the botanical canons, which demand some medium of publication generally accessible, which a political journal not likely to be preserved in public libraries can scarcely be accounted. I feel therefore upon the whole bound to adopt the name assigned by the great French cryptogamist. The following characters were transmitted to me by him, together with copious sketches of this and other species which I have availed myself of in the figures. It was his intention to have published them himself, but at my request he gave up the intention, placing his materials in my hands—a mark of kindness and liberality which demands public thanks, though only one amongst a multitude of similar instances.

The species is characterised as follows :—

Botrytis infestans, Mont. cespitosus laxis erectis albis apice plus minus ramosis; ramis passim nodosis erecto-patentibus, sporis lateralibus terminalibusque solitariis ovoideo-ellipticis pro ratione magnis concoloribus subapiculatis, nucleo granuloso. Mont. L'Institut, 1845, p. 313.—*Botrytis fallax*, Desm. MSS.—*Botrytis devastatrix*, Lib.—Morren, in Ann. de la Soc. de l'Ag., &c., de Gand, 1845, p. 287, cum Icone.

Hab. in pagina inferiori foliorum Solani tuberosi neonon in tuberculis ipsis aggeratis.

Macule albe farinosae parum densae aut confertae in parte folii inferiori observantur. Flocci steriles inter meatus intercellulares repentes, fertiles, qui e stomatibus emittuntur, inter pilos folii sparsi erecti subtus simplices $\frac{1}{2}$ lineam in tuberculis attingentes superantesque, sepius vero presertim ad folia $\frac{2}{3}$ lineam metientes, apice ramosi septati albi. Rami 2 ad 6 erecto-patentes acuti virgati passim elliptico-subincrassati hinc nodosi. Sporae pro ratione plantae maxime primò globulose ovoideæ tandem ellipticas et tum seminibus Peponis non absimiles, altero fine ad speciem mammillatae subapiculatae, altero vero brevissime pedicellatae, pellucide floccis concolores, nempe niveæ, intus sporulis endosporio inclusis farctæ. Long. spor. $\frac{3}{100}$ millim., crassit. $\frac{2}{100}$ millim.

* Ann. de la Soc. Roy. d'Agriculture et de Botanique de Gand, 1844, p. 290.

† Dr. Montagne had several days previously communicated it to me with a complete analysis, under the same name.

‡ Rev. Bot. 1845, p. 151.

The peculiar characters of the species consist in the few erecto-patent not forcipated or uncinate branches, the scattered spores, and above all the torulose swellings which give it somewhat the appearance of *Gonatobotrys*. The spores however are not disposed round the knots as in that genus and *Arthrobotrys*, or even confined to them. The only species which exhibits anything of the kind is one which has been named *Botrytis Urticæ* by Mlle. Libert, and which indeed M. Desmazières considered as identical. It appears to me however that it is quite distinct, the flocci being far more divided, the apices bifid, and the colour, instead of white, a greyish lilac. I have had the opportunity, fortunately, of comparing specimens, which occurred in the autumn, at Tansor, in Northamptonshire, with authentic individuals from M. Desmazières. Various allied species occur in similar habitats characterised by their large spores. These, though closely allied to each other, differ in their mode of ramification and in the form and size of their spores. The best known of these is *Botrytis parasitica*, which occurs on *Cruciferæ*. Of this, as occurring on the leaves of cabbages and Swedish turnips, I add a figure, as also brief characters and figures of four undescribed species, for the sake of comparison with *Botrytis infestans*.

Botrytis Arenariae n. s. nivea ; floccis fertilibus sparsis superne dichotomis, apicibus divaricato-furcatis non uncinatis ; sporis ovatis terminalibus.

Hab. in paginâ inferiori foliorum *Arenariae trinervis*. June, King's Cliffe.

Botrytis Viciae, n. s. nivea ; floccis fertilibus elongatis sparsis parcè ramosis ; ramulis bifidis non uncinatis ; sporis obovatis apiculatis terminalibus.

Hab. in paginâ inferiori foliorum *Viciae sativa*. June, King's Cliffe. A distinct species, forming definite purplish patches, occurs on Peas.

Botrytis arborescens, n. s. nivea ; floccis fertilibus superne ramosissimis di-trichotomis ; apicibus subforcipatis ; sporis terminalibus minoribus subglobosis.

Hab. in paginâ inferiori *Papaveris Rhoras*, quod omnino destruit. June, King's Cliffe.

The plants are attacked when quite young, and have a peculiar aspect by which they may be known at a distance.

Botrytis glandioniformis, n. s. nivea ; soris definitis ; floccis fertilibus superne ramosis, ramulis curvatis sub apicibus dilatatis glandioniformibus ; sporis minoribus terminalibus subglobosis. B. parasitica var. *Lactucae*, Berk Brit. Fung., No. 331.

Hab. in paginâ inferiore *Lactucae* in hortis. May, King's Cliffe.

Many other undescribed species occur, related to *Bot. effusa*, Grev., but differing in various characters. All exercise a greater or less influence on the health of the plant attacked. Dr. Moren informs us that beet-root has suffered from a species during the present autumn, and also pear-trees.

No good figure has yet appeared of *Botrytis Bassiana*, which attacks silkworms : I have therefore availed myself of a sketch kindly communicated by Dr. Montagne. It will be seen that it is extremely like *Botrytis diffusa*, Alb. and Schwein ; but this is, I believe, more in appearance than reality, for perfect specimens of that species exhibit a very complicated structure, each head consisting of numerous lobes, each of which bears a num-

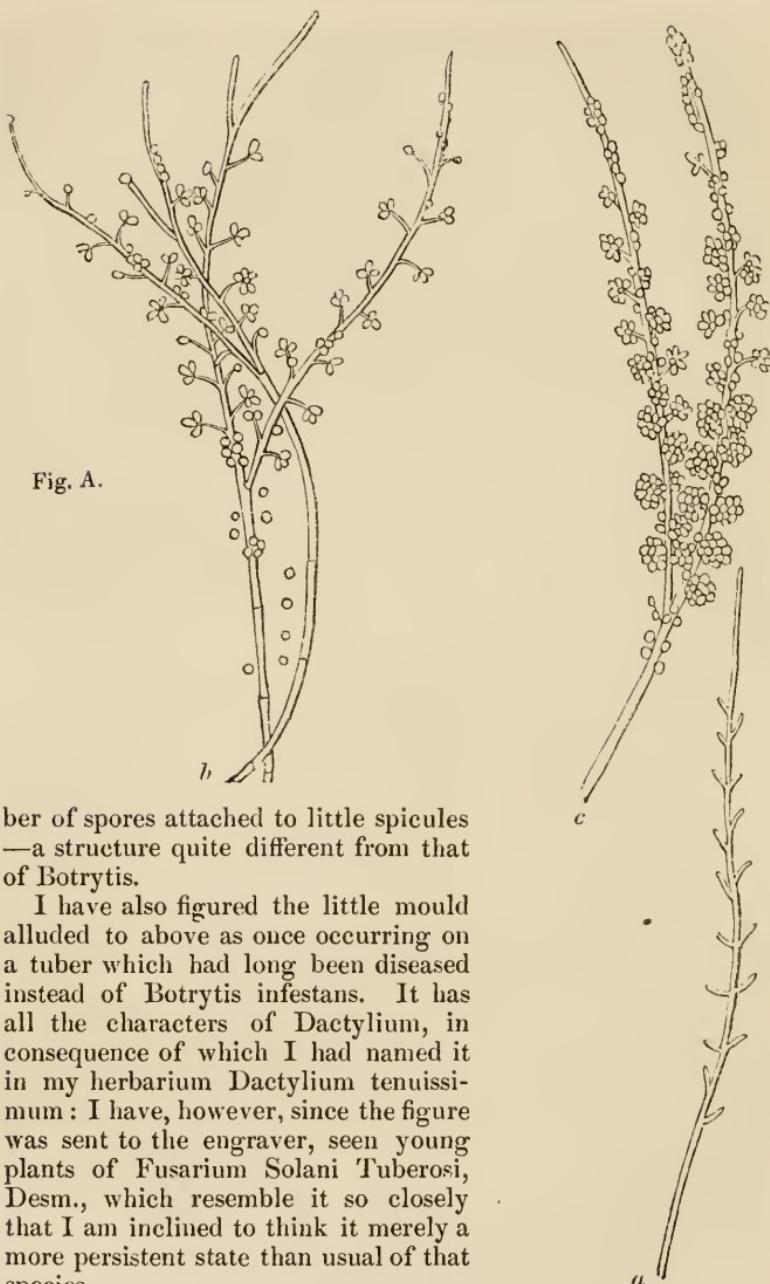


Fig. A.

ber of spores attached to little spicules —a structure quite different from that of *Botrytis*.

I have also figured the little mould alluded to above as once occurring on a tuber which had long been diseased instead of *Botrytis infestans*. It has all the characters of *Dactylium*, in consequence of which I had named it in my herbarium *Dactylium tenuissimum*: I have, however, since the figure was sent to the engraver, seen young plants of *Fusarium Solani Tuberosi*, Desm., which resemble it so closely that I am inclined to think it merely a more persistent state than usual of that species.

Fig. A. *Botrytis Bassiana*, from a sketch by Dr. Montagne. a. Young thread. b. Thread more advanced, with young spores. c. Ditto full grown, with mature spores.

Amongst the diseases noticed by Martius is one which he considers as depending on a species of *Protomyces*. As I have seen this in various stages of growth and attached to its flocci, I have thought it worth figuring. It appears to me to belong to the genus *Tuburecinia*, Fr. The spores have usually one or more cavities in the surface communicating with the interior cavity. They may perhaps therefore be considered rather as compound bodies consisting of a quantity of cells arranged in the form of a hollow ball. This view of their structure requires more attention than I am able to give to it at present.

I shall end the memoir by giving the characters, after Dr. Montagne, of a highly curious fungus discovered by Dr. Rayer, chief Physician of the Hôpital de la Charité, at Paris, during the course of a series of observations on potatoes. It is produced and fructifies in the intercellular passages of germinating potatoes.

ARTOTROGUS, Mont.

*Flocci continui ramosi flexuosi per meatus intercellulares vagantes serpentesque. Spore terminales vel (ob proliferationem?) medio filo insertae, primo leves, sphaerice, rufæ, intus farcta, tandem solute, libere, echinulatae. Locus in systemate inter *Sepedonium* et *Tubureciniam* prope *Asterophorum*.*

Artotrogus hydnosporus, Mont. — *Gard. Chiron.*, 1845, p. 640.

Hab. inter meatus cellulares tuberculi *Solani tuberosi*, germinatione absolutâ.

King's Cliffe, Nov. 22, 1845.

- Fig. 1. Potato in an early stage of the disease.
2. Section of one in which the disease is more advanced.
3. Small ash-leaved potato, showing a concentric arrangement of the spots. In larger tubers there are sometimes two systems of concentric spots.
4. Vertical section of a small red potato, in which the portion to the left has become green externally; showing the external cells and a few of the internal feculiferous cells (*a*), some of which at (*b*) are attacked by the disease, and, in consequence, have their walls clouded with brown specks. The cells immediately beneath the cuticle do not contain fecula, though they sometimes seem to do so under the microscope from stray granules having been introduced accidentally. Four of the lower cells exhibit *Botrytis infestans* just commencing. The grains of fecula in the diseased cells are, in this stage of the disease, not diminished in number, but some have escaped in consequence of the division of the cells. In the external cells the cytoplasmic processes are visible at (*d*), which in the green portion (*c*) are greatly enlarged, and furnished with radiating processes.
- 4.* Appearance presented by healthy and diseased cells when boiled.
5. Horizontal section of diseased cells (by Dr. Montagne) magnified 380 diam. The lines on the grains of fecula are omitted, to simplify the figure.
6. Horizontal section from surface of an apparently sound potato, showing abundant mucinous threads. This potato, when exposed to the sun with a view to observing the changes which take

- place in the contents of the cells during the process of greening, became in a few days highly diseased.
7. Section of one of the dark patches on the stem which occur in the course of the disease. There is no trace of mucedinous filaments, but the cells are filled with a dark grumous mass.
 8. Horizontal section of another patch exhibiting several mucedinous threads.
 9. Section of potato-leaf, showing the hyphasma of *Botrytis infestans*, *Mont.*, creeping amongst the loose tissue of the underside, and sending up fertile shoots through the stomate. The mould is still young, one shoot not having at present formed any branches or fruit. The tissue of the upper surface of the leaf is too compact to allow the threads of the mould to traverse it.
 10. A portion of the cuticle of the lower surface, showing the threads of the *Botrytis* proceeding from the stomates. The mould, with the exception of the plant at the left hand, is scarcely more advanced than in the preceding figure.
 11. Portion of cuticle of the lower surface more highly magnified, showing three forms of stomates, from one of which proceeds a young plant of *Botrytis infestans*.
 12. View of a horizontal slice of the cuticle of the lower surface of a leaf viewed from within, and showing the disposition of the stomates in the reticulations formed by the loose tissue.
 - 12.* Full-grown *Botrytis infestans*, from leaf, partly from a sketch by Dr. Montagne.
 13. Dwarf form from stem, sent from Bristol by C. E. Broome, Esq.
 14. Full-grown plant from tubers, partly from a sketch by Dr. Montagne.
 15. Base of two filaments, 780 diam., from sketch by Dr. Montagne. This is not the normal structure, but merely a curious form assumed by certain filaments accidentally detached from the hyphasma.
 16. Extremity of branch, with two swellings. 380 diam.
 17. Occasional appearance of spore. 380 diam.
 18. Spores with their contents. mag. 380 diam.
 19. Spores, 780 diam. This and the four preceding figures are from sketches kindly sent by Dr. Montagne.
 20. *Dactylium tenuissimum*, *Berk.*
 21. Spores of ditto.
 22. *Botrytis Arenariae*, *Berk.*
 23. *Botrytis Viciae*, *Berk.*
 24. *Botrytis arborescens*, *Berk.*
 25. *Botrytis ganglioniformis*, *Berk.*
 26. *Botrytis parasitica*, *Pers.*
 27. *Artotrogus Hydnosporus*, *Mont.*
 28. Thread of ditto, mag. 780 diam.
 29. Mature spore of ditto, 380 diam. This and the two foregoing figures are by Dr. Montagne.
 30. *Tubercinia scabies*, *Berk.*
 31. Cells from surface of ditto.
 32. *Botrytis Bassiana*, from a sketch by Dr. Montagne.

III.—*Chemical Observations on the cause of the Potato Murrain.*

By Edward Solly, F.R.S., Experimental Chemist to the Horticultural Society, etc.

[Communicated by order of the Chemical Committee, Dec. 16, 1845.]

In the following brief observation on the potato rot, I propose to consider the chemical nature of the changes which the potato undergoes, the causes necessary to produce such changes, and the peculiar conditions which probably led to the disease or epidemic which has so largely attacked the potato crop of the present year. The subject is a very extensive one, including as it does many practical considerations of high importance; such as, the value of sound and diseased potatoes as food; the best modes of checking the progress of the rot; the processes for preserving the starch, and economical modes of applying the products to useful purposes; the best method of storing and housing the crop; the prospects for next year's crop; the precautions to be taken, the manures and dressings to be employed. I shall, however, confine myself entirely to the consideration of the cause from which the disease originally sprung.

It is unnecessary to say more respecting the potato disease, and the mode in which it gradually appeared, than to remark, that in the early part of the past season, the crops looked remarkably healthy, and promised an abundant harvest: at a particular period, namely, about the end of July, the plants changed considerably in appearance, looking as though they were frost-bitten. This change was by no means general, but appeared in many places in various parts of the country, seeming to spread, or at least became apparent after a time, in fields which at first had seemed not at all affected. About the same time that the change was perceived in the leaves, it was observed that the tubers also were affected with a kind of rot, which commencing either in the centre or towards the outside, gradually spread throughout the whole substance of the tuber, and eventually caused its entire putrefaction. This singular disease was not confined to any one country, it appeared nearly at the same time in most of the northern countries of the globe; though it was first observed in the more eastern countries, and almost immediately made its appearance in those to the west. The disease, however, was not universal, as particular countries and districts, even in the midst of those where the disease had made the greatest ravages, were but partially attacked, or even wholly exempt from its effects; it was also not confined to particular soils, or particular varieties of the plant; though generally speaking the plants which had nearly or wholly ripened their tubers at the commencement of August, were those in which the disease made

the smallest ravages; the tubers which were imperfectly ripened, and those which were still quite young at that period, for the most part sustained the greatest injury.

Before proceeding to examine the nature of the effects produced in the tubers by this disease, it will be necessary to describe the chemical composition of ordinary potatoes. Potatoes consist of starch, fibre, gum, resin, azotised matter, inorganic salts, and water; the relative proportion of these various substances varies considerably, depending on the variety of the potato, the soil in which it grew, and the peculiarities of the year in which it was formed. Generally speaking, the proportion of water constitutes three-quarters of the whole bulk, 75 being about the average per centage, but it varies from 66 to 82. The following analysis of a bread-fruit potato, of 1842, will serve to give a tolerable approximation to the ordinary composition of the tubers: it is selected out of many similar analyses.

Starch	.	.	.	.	.	13020
Gum, with a portion of sugar	.	.	.	.	.	3650
Fibre	.	.	.	.	.	4000
Soluble azotised matter—Albumen	.	.	.	.	.	953
Insoluble azotised matter—Gluten	.	.	.	.	.	1150
Resin and wax	.	.	.	.	.	750
Water	.	.	.	.	.	75161
Potash and Soda, with (organic acids.)	.	.	.	.	.	982
Sulphuric acid	.	.	.	.	.	48
Chlorine	.	.	.	.	.	67
Earthy phosphates	.	.	.	.	.	163
Lime	.	.	.	.	.	17
Magnesia	.	.	.	.	.	24
Oxide of iron	.	.	.	.	.	9
Silica	.	.	.	.	.	6
						100000

The composition of potatoes varies also considerably in the different stages of their growth ; when young, the proportion of earthy matters, azotised matter, and water, is frequently much higher than when ripe ; the proportion of water is almost always from 5 to 10 per cent. higher than in the mature tubers, being often higher than 80 per cent. On examining plants attacked with the disease, it was found that in some the disease first made its appearance in the leaves, in others the stems were first affected, whilst others again had sound and healthy tops whilst the tubers were affected ; in every case however which I examined, the under-ground stem, or that part of the main stem of the plant, just below the surface of the soil, from which the roots proceed, was found to be more or less decayed ; in a great many cases the roots were entirely rotted, and fresh roots had evidently been formed by the action of the still growing haulm.

The composition of the sound tubers of diseased plants did not

present any marked peculiarities, further than that the per centage of fibre was rather lower than usual, whilst that of water was decidedly above the usual average. In the decaying tubers there was also found more water, but less azotised matter and less fibre than usual; a considerable quantity of free ammonia, and traces of sulphuretted hydrogen being also present. As might have been expected, those parts in the vicinity of the eyes were generally the first to change, the ordinary effects of germination being apparent along with those of the diseased; hence in those parts the starch was partially converted into sugar, at the same time that the cellular and azotised matters putrefied. The following shows the relative proportion of the organic constituents of sound bread-fruit potatoes of last year, and two preceding seasons.

	1842.	1843.	1845.
Starch	1074	1383	1004
Fibre	652	685	482
Gum and resin	504	284	266
Soluble azotised matter—albumen	87	80	86
Insoluble azotised matter—gluten	103	121	100
Water	7610	7447	8063
	10000	10000	10000

From these few facts it is evident that the disease is a putrid fermentation, or “mortification,” of the organic matter of the plant; the question then arises, what was the cause of this fermentation? The effect was clearly a chemical change, a resolution of organic substances into simpler forms of matter; and accordingly it is reasonable to expect that some definite chemical cause may be found to which these effects can be traced. Various theories have been proposed to account for the origin of this putrid matter: the most plausible, or at least the most strongly supported of these views are—1, That it is caused by fungi; 2, by electricity; 3, by simple eremacausis or excolation, in consequence of deficiency of vital energy in the plant; 4, by deficiency of light and heat. Besides these, several other theories have been suggested, of which it is unnecessary to speak, as the effect is evidently mistaken for the cause. I will now endeavour to show in how far their several views are sufficient to account for the chemical effect produced.

It has been stated, and that by some of the highest authorities, that the disease is caused by the growth of microscopic fungi. That they exist in enormous numbers in the diseased potato, as indeed they do in almost all forms of decaying organic matter, cannot be doubted; but that they could possibly alone cause such a disease as that which has this season manifested itself in the potatoes, seems to me to be incomprehensible; we must at the

outset be led to ask, why there should be such an immense development of fungi this year, above all previous years? and the only legitimate answer to this question appears to be, that the plants were to a certain extent in a diseased state, which favoured the growth of the fungi. In stating that the fungi were the cause, we in truth only express the fact in a new and rather objectionable form; because then the main question is merely resolved into—What was the cause which led to such an extraordinary growth of fungi. The term however is objectionable, because there is no evidence that fungi have the power of inducing putrefaction; on the contrary, all chemical evidence would lead us to an opposite conclusion, viz., that fungi grow in putrefying organic matters because they there find abundance of those substances on which they live. When a number of solutions of animal matter are placed in the circumstances most favourable to putrefaction and the development of fungi, it is always found that fungi grow and flourish in some, whilst the other solutions are free from them, being in fact only developed in those which are in that state of putrefaction favourable to their growth; moreover, they do not appear until the solution has acquired that state. Again, organic matter placed in those conditions necessary to the growth of fungi, and properly inoculated with them, the conditions requisite to decay being excluded, do not decay even though the fungi grow. Fungi never grow except in decaying organic matter, but decay frequently exists when no fungi are present.

As far as my own microscopic observations enabled me to form any judgment, the growth of the fungi followed but never preceded the decay of the potato—it was the result but not the cause. At the same time, however, there is no doubt whatever that the growth of fungi does accelerate those changes which constitute decomposition, both chemically and also mechanically, by loosening the adhesion of the cells and destroying the continuity of the vegetable membranes.

The statement that the disease was caused by electricity, appears to have been unsupported by any evidence, and merely thrown out as a possible thing; a very little consideration will show its extreme improbability. Plants growing in the free and open fields might possibly be affected by a deficiency or excess of atmospheric electricity; but supposing that they were so, it is evident that those which grew under the shadow of trees, and in other situations where they must be protected from the influence of free electricity, would not be so affected. Now it was found this year that the vicinity of trees, &c. did not in any way diminish or increase the effects of the disease. An argument in favour of the electric theory was endeavoured to be drawn

from a statement made in Ireland of a lambent phosphorescent light having been observed playing over a large field of potatoes one night, which a few days subsequently were found to be attacked by the disease. It is most probable in this case, that the light observed was that luminous effect frequently seen when organic matter is decaying, and that the potatoes were in fact already decaying when the light was noticed. The luminosity of decaying potatoes has been frequently remarked, and strong phosphorescence has even been observed from sound potatoes in a state of germination.

The third and fourth of the theories quoted, may properly be considered together, being in fact closely connected. It is well known that at a certain period of the year there was a remarkable deficiency of heat and light, and consequently the chemical functions of the plant must have gone on but languidly at that time; but there is no evidence to show that the vitality of the plant was in any way weakened; on the contrary, it appears from several circumstances that the plants were far from deficient in vitality. It has been supposed that the rot was a mere effect of oxidation or *eremacausis*, the oxygen of the air burning the vegetable tissue in consequence of the decreased vitality of the plants being no longer able to withstand its action; this explanation however is not only rendered improbable by the great vitality of the plants, but also by the fact that in the earliest stage of the disease it is scarcely at all accelerated by the action of an atmosphere of moist oxygen gas, which, were this explanation correct, ought to increase the decay rapidly.

It has also been stated, that the disease was caused by oxidation of the tissues in consequence of their being thin and imperfectly formed; this alone, however, could not account for their decay, unless the vitality of the plant likewise were feeble, a condition not generally accompanying rapid and vigorous growth. The cellular tissues of the potatoes were quite as perfect and complete as the cellular tissues of young plants, and the young and freshly formed parts of a healthy plant do not exhibit any tendency to putrefy or decay from mere oxidation; in fact, if the mere presence of a large quantity of water and excessive permeability of the membranes were the causes of the disease, all young tubers would be exceedingly liable to it, as they contain a very high proportion of water, and their cells are but imperfectly formed.

After a careful examination of the various arguments which have from time to time been brought forward in support of the different theories, and an attentive consideration of the facts of the case, I must confess myself still of the same opinion which I

published early in September,* as to the proximate cause of the disease, and which in several points resembles that published by Dr. Lindley in August. I believe the disease was caused by the presence of putrefying azotised matter in the stem, just below the surface of the soil ; the natural circulation of the fluids of the plant carried this ferment, for such we may term it, to all parts of the plant, causing throughout a struggle between the vital force and the chemical force of fermentation, or induced decomposition. That the change was really one of this kind, and not a mere effect of oxidation, is proved, I think, by the fact that the disease commenced and proceeded quite independent of external oxygen. Assuming for granted the truth of this view, it still remains to account for the presence of putrid matter in the interior of the plant. Although no similar epidemic has been observed amongst plants in any previous year, yet we cannot say that it is altogether new and unprecedented ; precisely the same disease has been observed in previous years, although never to the same extent, and numerous isolated cases might be quoted, in which potatoes, and also other plants, have suffered from a similar cause. A strong case of this kind came under my own observation in the summer of 1843. A small field of turnips, in the Horticultural Society's Gardens, which had been manured with various saline substances in strips or beds, and which was growing most luxuriantly, was observed at the end of August, when the bulbs were about half formed, to have received some sudden check ; the tops gradually became yellow, and at the same time the bulbs softened and putrefied, the rot generally commencing in the centre and spreading all round. Towards the end of September at least two thirds of the crop were thus lost, and this certainly amounted to some thousand turnips. It was at first thought that the manures used might have caused the rot, but examination showed that those not manured at all were among the first to go. These turnips, when compared with those of the previous year, were found to contain an unusually large proportion of water, as the following table shows :—

	Water.	Organic.	Inorganic.
White globe turnip, 1842	9173	743	84
Ditto 1843, manure sulph. lime	9390	539	71
Ditto 1843, no manure	9396	525	79
Ditto 1843, manure, sulph. potash	9454	448	98
Ditto 1843, manure, mur. potash	9581	343	76

The second and third were perfectly fresh at the time of examining them, the two last were taken as having just commenced to change.

* Gardener's Chronicle, September 20.

Azotised matter in that condition necessary to its acting as a ferment, may exist in plants from two causes ; the partial decomposition of gluten and albumen already formed, or the imperfect and incomplete formation of these substances : either of these causes might account for the effects under consideration, and it is by no means a simple problem to determine to which of these two it is really due. The fact that no epidemic of this kind has been observed for many years, shows that the cause must be complicated, depending upon a combination of several conditions, which do not frequently occur together. In the present season, and at a time when the plants were in full growth and vigour, there happened several very remarkable alterations of weather, and from hot and dry there was a rapid transition to cold and damp ; evaporation being checked in a sudden and unusual manner. At the same time that evaporation was thus diminished whilst growth continued, the influence of light was also to a great extent impeded ; a continuance of cloudy weather ensuing, the effect of which was very materially to reduce the whole quantity of sunshine during that period. Amongst the causes which may possibly have contributed to cause an unhealthy state of growth in plants, light certainly is not the least important ; and it must be remembered that besides being deficient in absolute quality, it may also have been deficient in chemical power. It is much to be regretted that we have as yet no record of the diurnal amount of chemical rays which reach the earth, and consequently have no means of judging of the amount of influence which may be due to this cause. I have endeavoured, though in vain, to ascertain whether any peculiar deficiency in chemical power has been observed by those who were experimenting with light during the past summer.

The potato rot manifested itself in two distinct forms this year,—the one a true putrid fermentation or wet rot, in which the whole tuber soon became converted into a brown shiny foetid mass ; the other a less rapid decay, in which the tuber slowly became converted into a brown spongy matter. The presence of water and putrefying azotised matter, and a moderate or elevated temperature, were requisite for the former ; whilst the latter, which more resembled eremacausis, prevailed, when less water and little or no putrid azotised matter existed in the tubers. Both forms of disease are however arrested by cold and dryness, decay ceasing to spread, and the diseased parts shrivelling up, a kind of false skin in some cases forming between the sound and the decayed part, which effectually prevents further decay.

A few isolated cases of diseased tubers, formed in houses, under peculiar circumstances, from tubers of last year, have been observed. Two cases of this kind have been mentioned to

me, as observed by Lord Hill and Sir J. Lubbock. In both of these, potatoes of 1844, under cover, had sprouted and formed young tubers, which, though never exposed to the air or weather, were found affected by the rot. I believe, however, that in these two cases, the disease was not the true rot, but a modification of the dry rot, which has been long known as sometimes occurring in potatoes.

In conclusion, I believe the potato disease was caused by a peculiar combination of atmospheric conditions, which, by suddenly checking the rapid growth of the plants, led to the presence of partly decomposed azotised matter in the lower part of the stem; this matter being carried through the structure of the plant at a period when there was little light, and consequently when the formation of organic matter was proceeding but slowly, communicated its own state by a process of fermentation, to various parts of the plant, and thus originated the evil; the increase of which was assisted by the abundance of moisture and the deficiency of light. If this view be correct, it is evident that the recurrence of such an effect in succeeding years is highly improbable, though of course at all times possible; depending on a singular combination of atmospheric phenomena, and liable to be produced whenever they again occur; but not to be expected as a permanent consequence of this year's disease.

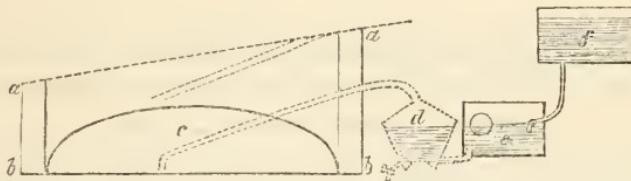
IV.—*Memoranda relating to the Cultivation of Melons.* By John Williams, Esq., C.M.H.S.

(Communicated with a Green fleshed Melon, weighing 2 lbs. 11 oz., and a Cabul Melon, weighing 2 lbs. 5 oz. Oct. 14, 1845.)

I have desired my gardener to send up a melon or two ripened in my frame, the south end of which is open to the outward air night and day, except that it has some fly-wire screen, the wires being very close together and painted black. This wire screen, standing as it does in the *continued inclination* of the roof, of course presents a metallic surface of black wire, and, say in summer time from 10 A. M. till 3 P. M., receives the rays of the sun; the wire is then heated say from 80° to 100°, and consequently heats the air which passes through the interstices of wire, and I always find the thermometer placed under the shade of the melon leaves standing at 80° or 85°; if a very hot day at 90°. The upper ends of the glass frame which forms the north side are raised by wedges according to the weather, from an inch to two

inches high, as soon as the sun is on the glass, and not closed till evening. This increases the indraught of air through the wire screen, and I consider on *every sunny* day the melons are exposed from 11 A.M. till past 3 P.M. to as hot an atmosphere as is experienced in the southern parts of Italy, with almost as much ventilation as if growing quite in the open air.

I have grown Persian melons this way for some years past, and obtained my bottom heat by tan and dry leaves, lining the north or upper end of the bed with mowings of my grass, weeds, &c. of the summer. But the *bottom heat* was often too great in the early part of the season, and declined too low in the latter part of the summer. Last spring, therefore, I adopted a certain mode of giving bottom heat, which I contrived forty-one years ago, when I made my grape-house: which is that of a steam-vault under the soil in which the plants are intended to grow. The steam-vault is formed by a brick arch; the sketch supposes an end section before the end is closed up by the brick-



work of the frame. *a, a*, brick 9-inch wall; *b, b*, the base of the elliptic arch to hold steam; *c*, the steam-pipe which conveys the steam from the boiler, *d*, holding five gallons, to blow against the surface of the flat brick floor, and thus spread the steam all over the vault instead of rising to the top of the vault in the first instance; *e*, the feed cistern with ball-cock on a level with the boiler to supply it with water; *f*, a small reservoir which holds eight gallons, to supply the feed cistern.

I find boiling the water for about two hours at intervals of twenty-four hours, gives a certain heat to the soil above the arch, and that the temperature of this soil always corresponds with the quantity of water evaporated, as is shown by the sinking of the water in the upper cistern.

According to Watt, steam at the temperature of 212° occupies 1500 times as much space as when it existed in its liquid state. I found that boiling the water for about two hours in twenty-four, gave me in ordinary weather in summer, a ground heat of from 78° to 82° or 83° , and that seven gallons of water were evaporated, as was shown by the loss of water from the upper cistern. Since $1500 \times 7 = 10,500$, this number of gallons of steam must pass into the vault, and become condensed on the under surface

of the arch and the upper surface of the brick floor, where it sinks into the ground and tends to keep up the heat.

The melon plants grew rapidly at about 82° of bottom heat; but in the warm weather in June, finding it rising too high, I omitted boiling the water from Saturday evening till Monday evening; this gave me a variable heat between 78° and 82°, the non-supply of heat for twenty-four hours on the Sunday giving the internal heat of the vault time to become reduced. My apparatus was rather too late in setting to work, and this, added to the unfavourable weather after the month of June, prevented my melons ripening properly. I had, however, one or two of the Cabul melons after being kept in a warm room for eight or ten days after they were gathered, which were melting and good; and had the season been such as the summer of 1844, I have no doubt but they would have proved excellent.

V.—*Local Habitation and Wants of Plants.* By the Hon. and Very Rev. William Herbert, F.H.S., Dean of Manchester.

(Communicated November 17, 1845.)

Cephalanthera rubra (otherwise called *Serapias rubra*) is said to grow in the woods of Ingleborough, in Yorkshire, and I once saw a weak specimen of it without flower in the neighbourhood of Hampton Common, in Gloucestershire. While I was in the neighbourhood of Thun I learnt that this plant, of which I had as yet seen nothing in my rambles amongst the woods in the mountains near the lake, inhabited a large wood further from the town. I was desirous of seeing it in its native place, with a view to observe what the circumstances were that caused it to be so rare and confined to peculiar localities. I therefore proceeded along the edge of the beautiful lake till I found myself opposite to the commencement of the wood that had been pointed out to me. It was very extensive, densely timbered, and exceedingly steep, the lower part of the declivity being occupied by meads and vineyards. It was evident that without some clue to discover the precise habitation of the plant I wished to find, I might, after a long scramble through a wood that was nearly precipitous, return home without having seen it. Looking therefore to the nature of the ground, it occurred to me that, if it grew under such thick shade in so steep a position, it would probably prefer the neighbourhood of some channel along which the rain-water rushed down from the mountain. I determined therefore to attack the wood at that point, and, entering the dry and stony

water-course by which the thunder-storm of the previous evening had hurried down its torrent to the lake, I followed it till I reached the border of the wood; and entering it, I had not advanced two steps before I saw three plants of *Cephalanthera rubra*, weak and without flower, in the channel, and growing from under some round stones washed down from the conglomerate above. The groove was here very deep, and its sides, on the right and left, too steep to be climbed without laying hold of the roots or boughs. I made my way however to the top of it, and proceeded some way along the brow and sides without seeing any orchidaceous plant, except the butterfly orchis. Thereupon I descended again to the bottom of the ravine, where I immediately found the *Cephalanthera* abundant, but weak, growing in a mixture of sand and rotten leaves under the round stones. Following the water-course upwards I continued to find it; and at last, on an angle of a stronger yellow earth, at the junction of two water-courses, I found the plant more abundant, stronger, and just coming into flower.

It seemed that this plant likes dense shade, not upon a northern slope, but in an aspect which lets in a checkering of sunshine; that it requires the heavy coat of dead beech-leaves to be washed away by waters, and its roots to be frequently refreshed by the great body of water that runs down after every heavy rain, but does not remain and stagnate on the ground. The dead stems of last year were still adhering to the plants, and I did not see a single specimen with two stalks either of the present or of the last year. At the foot of each stalk, where it joined the fibrous roots, was a single eye for the next year's shoot. With this knowledge of the plant's habits (if those which I brought home survive the transplantation and journey in the season of their growth, so as to sprout again) I should hope to be able to cultivate them.

I had previously observed that *Cypripedium Calceolus*, growing in open grassy spots on the steepest knolls in the woods, was in its glory on the brow of a deep ravine, through which a strong and constant stream of water ran down, which after heavy rains would be greatly swollen. The earth seemed also to be moistened by water from above, unable to penetrate the rock underneath, and occasionally bursting out through the soil. It is evident to me, that mountain-plants require much moisture, and that drought is their principal enemy in cultivation.

I observed *Gentiana verna* flourishing on the southern brow of the San Gothard Alp, where the clouds must often rest: I next saw it more vigorous in the marshes between the lakes of Thun and Brienz, where water was absolutely standing, in company with *Primula farinosa* and *Orchis latifolia*, both notori-

ously swamp plants; the former of which flowered most profusely when absolutely in the water of a ditch. I afterwards observed *Gentiana verna*, not less healthy, with *Pinguicula vulgaris*, in such a hill-side bog near Thun as a jack-snipe is apt to select for his residence.

Orchis (or *Herminium*) *Monorchis* is found in England on slopes of chalk and stonebrash. I met with it in the reed-beds close to the edge of the lake of Brienz, in company with *Epi-pactis* (or *Serapias*) *palustris*; and I also saw one vigorous plant of *Orchis militaris*, which is reputed to grow only on dry chalk, in the same marsh; and three in a flat, half-flooded meadow near the sea, a few miles from Trieste.

These observations lead me on to a question which has often suggested itself to me, "Why do plants, which are found only in particular situations, improve under cultivation, and (as I believe to be the case) more so than those which are generally dispersed?" and, consequently, "Is the soil or subsoil, on which alone certain plants are found in a wild state, necessary to them, or at least always best for them?" I think the answers must be "No" to the latter question; and to the former question, "Because their most dangerous rivals, which in a wild state would overpower them, in richer soil are removed;" and that in truth the weaker plants in many cases are peculiar to those soils which are not best for them, but where they can exist, and where the grass and other enemies cannot grow with sufficient strength to choke them.

I found *Crocus variegatus* on the Carso of the mountains behind Trieste, where the grass is so meagre that the grey stones look through it; but there a very small proportion of the bulbs bear flowers, and still fewer yield seed. The crocuses of the Ionian Islands are in the same manner dispersed amongst the rocks and stones of the mountains, where there is scarcely any grass, and in the spots where the cistus and other mountain-shrubs do not overpower them; but they flower and fruit very sparingly, and the bulbs are very small and weak: and the same I understand to be the case on the Alps of Trebizond, where, as well as on Bithynian Olympus, the bulbs are curiously diminutive from the poverty of the soil and bleakness of the position. On Mount Roudi, in Cephalonia, the greater part of those I saw were perishing from a murrain which seemed to have been induced by very wet weather in February and March. Yet crocuses brought from calcareous mountains into the garden of a Dutch florist, and severed from their native soil, acquire tenfold vigour and size of bulb. Few, however, of the crocuses from rocky mountains flower when taken up till they have been one year in cultivation. I apprehend the fact

to be this—that, if the seed of the crocus were to fall in such a goodly heritage without the protection of the weeding-hoe, it would be strangled in its birth by stronger occupants; and that, on the chalk and other calcareous rocks, there are places where few vegetables can exist; while the bulbs of this and some other genera take refuge there and get a poor livelihood in peace and quiet. I saw a *Crocus*, a *Sternebergia*, and an *Ornithogalum* growing in contact with each other aloft on the meagre sod of Mount Cénos; but not a seed-pod of the *Sternebergia* could be discovered, and very few of the *crocus*. In a more fertile sod they would have been choked by some stronger plant, but they would rejoice in a better soil, if protected against the oppressor.

The usual habitation of the various species of *crocus* is on calcareous mountains; and, as such are of various descriptions, they seek a more elevated or a steep position, which is unfavourable to the growth of grass, on those which are most fertile. Some species, however, like more humidity than others; and *C. speciosus* and *Byzantinus*, which desire a fertile soil, seek the shade of woods, where the roots of trees perforate the earth and render it looser and drier than it would be otherwise. From the mountains behind Trieste to the south of Greece the soil on which *crocus* grows becomes gradually redder as we advance, and is intensely so in the neighbourhood of Nanplia: in Negropont it is browner, and on the lofty Veluchi, in Ætolia, slightly ferruginous towards the summit; but the bulbs are more vigorous in detritus of greyish greenstone, on its lower projections and near its base. In all these positions the soil is rather strong, but dry. One only species in the Cyclades is said to grow in sand *upon clay*.

The compost, in which the Dutch raise their improved bulbs of various kinds, is known to be (see Sismondi, des Jacinthes) a compost of humus, obtained from thoroughly decayed elm-leaves and dung of stall-fed cattle, and mixed with sand deposited by the sea on a bed of prostrate timber of unknown antiquity, in which there is probably nothing calcareous. Does it not then appear that the case stands thus—not that calcareous matter is essential to the growth of *crocus*, or even a useful auxiliary, but that *crocus* can bear the sterility of elevated calcareous mountains better than most other plants of stronger growth? If that be true of one genus, it will probably be applicable to others.

Let us proceed from that consideration to more general views. The richest soils, if well moistened, will necessarily be occupied by the vegetables which grow most rapidly, and with such spreading and persistent foliage as to prevent slower but more robust rivals from gradually supplanting them; but that

which has sufficient powers of endurance to struggle through, will become the ultimate lord of the forest. Such is, perhaps, the sugar-maple of America, which is said to reign almost exclusively on the best soil. In each successive grade of inferior fertility the like struggle must be maintained, and the power of endurance must finally determine which shall be the occupants of each several position; though the question of endurance will turn upon various points, such as excess or deficiency of light, heat, and moisture, and denseness or lightness of the atmosphere or soil.

The first step in cultivation is therefore the use of the extirpator of intrusive vegetables, whether it be the hand, or the hoe, or the plough and harrow; the second step, after having ascertained whether the plant in its natural state exists by enduring the want or the excess of moisture or heat, will be to relieve it from the necessity of such endurance, as far as it is injurious to its vigorous development. Thus it will be found that *Orchis latifolia*, removed from the swamp, in which it struggles with other swamp-plants, will grow more vigorously where it is cultivated with less wet. The small *Polygala vulgaris* is stated in Mr. Babington's Manual to grow in dry pastures, having flowers either blue, white, or red. I believe the stated habitation to be only thus far true, that it does not grow in water. I do not recollect seeing it in sandy pastures: I know it well on chalk and on clay. In England it is little admired. In the alluvial and very moist meadows of Zante, near the sea, in the vicinity of Trieste, it formed a most conspicuous part of the meadow-crop at the end of May, and the beauty with which it painted the herbage was to me astonishing. It seemed that, in a warmer climate, it could endure more moisture than with us. On the slope of Monte Spaccato, where no grass grows, large single plants of it stood in the bare soil amongst the stones, with every intermediate diversity of pearl-colour and lilac, showing evidently that the merits of that little plant under cultivation are not appreciated or known. We must recollect that sandy soil could not abide on very steep hill-sides.

On the San Gothard pass I observed the little yellow violet, of which I had possessed a plant twenty-five years ago that was quickly lost, flowering profusely on the northern face of rocks from which water oozed through every crevice. Sometimes its roots were confined between two horizontal layers of stone, and it flourished all along the crack, in the manner of the small trailing snapdragon; sometimes it grew under an overhanging ledge of rock; but, where the ground amongst the rocks was constantly moistened by a fresh supply of oozing water and the sun did not reach, it luxuriated.

The Pyramidal Saxifrage delights in similar positions, growing often on the bare rock, of which the crumbled particles gathered round its roots, and they were constantly refreshed by the issuing moisture; but it had a wider range than the yellow violet: flourishing in such positions in the narrow valley of the Ticino as well as on the Alps, its graceful blossoms waving in the air, and pendulous, not naturally pyramidal. The rare *Saxifraga mutata*, which has the same general aspect as to the foliage, with a spike of yellow flowers, was pointed out to me in the neighbourhood of the lake of Thun actually riding on the water of a mountain-brook, with its roots spreading under a large stone in a wide naked space of round and pulverised stones, towards the mouth of the deep ravine along which they had been brought down from the mountain. I was told that I should have no chance of preserving it alive, unless it could be planted immediately. It was therefore tied up in a piece of linen with a handful of the stone-powder in which it grew, and, being kept moist, it reached England alive. Climbing the steep sides of the ravine afterwards, I saw several more of the same species aloft, where the water burst out, and one was growing in a tuft of moss. I pulled up another also, which was near, and, inserting its roots into the same moss, I tied the moss in the shape of a ball, and they were so brought to England. The first was potted in its native soil, and, having been left three weeks in the care of my gardener, was found to be dead on my return. The moss-ball had been set in the mouth of a pot filled with moss, and placed in a large pan of water. The two plants in it have continued to thrive well, and that which had been pulled out of the ground cannot be distinguished from the original occupier of the moss. The plant was figured about forty years ago in the 'Botanical Magazine,' where it is stated that great care must be taken not to give it much water. It is very possible that in a pot of earth, the wet which is suitable on a rock in moss might cause the fibres to rot, if the drainage were insufficient. I am however satisfied that the difficulty of cultivating *Gentiana verna* arises merely from its thirstiness, and that it should be planted in a mixture of strong soil with peat, or in a bed of peat on clay. It is said that *Epigaea repens*, which has been found the most difficult of plants to cultivate, will thrive in a peat-bed of great depth. I apprehend that in such case its extreme roots find moisture below when the peat near the surface becomes too dry for it. Probably a less depth of peat would preserve it, if a cup-formed bed of clay were placed under the peat to retain moisture.

VI.—*The Main Points of Vine Cultivation.* By Mr. Robert Errington, Gardener to Sir Philip de Malpas Grey Egerton, Bart., M.P., F.H.S.

(Communicated with specimens of West's St. Peter's Grape, Nov. 4, 1845.)

In compliance with the desire of the Council of the Horticultural Society, I beg to accompany the late grapes now exhibited with a few general remarks on the most important points connected with the cultivation of the vine, especially under glass.

With regard to border-making and thorough drainage: I am persuaded that a vast proportion of the grapes which do not colour well, are planted in borders not adapted to meet the great extremes of moisture to which our fitful climate is subject. It is also certain that over-cropping alone is one cause of the colouring, and of course the flavouring, process being incomplete in a great number of cases.

It is quite clear from numberless instances, that porous materials for the mere transmission of moisture, and of course atmospheric influences, may be used to the extent of nearly one half the volume of the compost with propriety. Mr. Hoare's system as it is called, although a failure, will, I make no doubt, have done much good in this respect: one of Mr. Hoare's chief errors being undoubtedly the total exclusion of soil from his compost.

Whatever depth of border may be adopted, the substratum should be so complete as to bid defiance to excess of moisture from both springs beneath, and atmospheric moisture above. This being secured, the next point is compost; chopped turf of a loamy character, and inclined to what is termed "sandy loam," is, I am assured, complete, or nearly so, in itself for this purpose, providing the previous points be efficiently secured: as, however, soils, as well as subsoils, differ so much in point of mechanical texture, it is perhaps wise on the whole to use a mixture which, in point of texture, may bid defiance to all weathers.

Two-thirds then of the loam above described, with the other third composed of equal parts of charred brush-wood, old plaster, and what is termed by agriculturists "half-inch bone," (boiled bone), will be found all that can be desired or nearly so in border-making.

The loamy turf should be from very old rest land, the older the ley the better; if not of considerable age, I would prefer it from an old lane or road side. It should be merely quartered with the spade, and should by no means be either cut or handled in any way when wet; dryness is as indispensable a point in handling the material for a vine border as for harvesting.

The loamy turf should be thrown in alternate layers with the other portion of the materials, which should be well blended together, and close at hand:—some raw stable manure, chiefly droppings, should be strewed in thin and regular layers, all through the mass: before, however, filling the above compost, which I should advise to be two feet in depth, I would place a layer of half-charred brush-wood, of some strength, over the drainage and substratum; this layer should be nearly a foot in depth.

Such a border I am assured would defy all weathers, and would be found after several years, on the stamp of a foot, to have preserved its elasticity in a very considerable degree; providing that mortal enemy to texture, “the spade,” be kept from it. It would only be necessary to cover the roots occasionally with a slight dressing of raw manure, the moment the vines had cast their leaves.

Some cultivators seem to think that a healthy vine will carry all the fruit it may “show:” so it will, but in what way?—why, in the production of small berries, deficient in colour and flavour; for be it understood, the two latter points always accompany each other. In addition to this another evil is to be feared, *viz.*, an injurious lessening of the vital energies of the vine.

It will generally be found, I believe, after all the complaints about large grapes, that the latter when *thoroughly* coloured are decidedly richer than the under-sized ones.

It may be asked therefore, what is the true medium to be observed? It is, I confess, not easy to answer this so as to be perfectly understood; however, as a general rule, I should say that spurred vines confined to the rafter, and established on the principle of border-making before detailed, will assuredly, under good management, produce from fifteen to twenty pounds weight each, every year, for many years. Vines spread over the whole house will yield a third more. It is, however, a better plan, where very superior fruit is the object, to keep below this mark. The leading shoot, if there be one, is a pretty good criterion of the energies of the vine; this, if the vine is honestly cropped, should always be disposed, and also allowed if possible, to ramble freely.

One point in connexion with good grape-growing is an elevated border. One half of the cubical contents of a vine border should, in my estimation, be above the ground-level of the front walk. Now it will be found, I believe, on close examination, that a great portion of the old vineeries in the kingdom, by a defect in the original plan of fixing the floor-line too low, preclude, by the level of the front sashes (if any exist), the possibility of the border being much higher. Now as it will, I con-

ceive, be admitted that the floor-line has in most cases an intimate relation with the wall-plate, and of course the front sashes, it becomes a matter of considerable importance to establish it aright ; and I always consider it an omen of good vine culture to ascend into a viney by several steps.

Another and a very common error, according to my opinion, is the mode of managing young vines for the first two years in newly-planted vineyards : they are disbudded and trimmed as sprucely as if the object was to carry heavy crops and to obtain plump eyes. Now the primary object of good cultivation should be, I conceive, to obtain a border tolerably well filled with roots.

The best way to accomplish this is to allow the top to run riot entirely for the first year, and nearly so in the second ; for without abundance of leaf there cannot be abundance of root. In the second year, however, the laterals should be stripped entirely away, in a progressive manner, from as much of the main stem as it is intended to retain at the winter's pruning, in order to admit light to the principal leaves, on the agency of which the success of the first year's fruit depends.

It has been the opinion of many, perhaps the majority of cultivators, that "shanking" in grapes is occasioned by atmospheric influences : I am of a very different opinion. I do not however say that such checks, through sudden depressions of temperature, do not assist in causing it—they fairly may. The chief cause is, however, torpidity in the action of the root, perhaps at the very period when the greatest demand is made upon it to sustain the excessive perspiration which is going on in the leaf, and to furnish fresh matter for elaboration ; to both which ends it is frequently quite inadequate, owing to drenching rains.

If the young fibre be examined at such inclement periods, it will be found somewhat discoloured ; nay, in some cases quite rotten. And this is not to be wondered at when the habits of the plant are duly considered, and the difference estimated between a vine on the slope of a rocky surface in the south of Europe or Asia, with six inches of soil, and one in the cold northern clime of Britain, in four or five feet of rich soil, every breathing pore closed with a kind of alluvium. This is no overcharged picture—I have seen scores of such cases.

Besides, if shanking were caused by sudden depressions of temperature, why should it not occur more frequently on walls out of doors, where the thermometrical changes are at least as great as in doors ? Yet here it seldom occurs, and here again the border is seldom so deep, so rich, or so far below the surface level, as some of our hothouse borders, many of which contain material sufficient for thrice their extent.

The West's St. Peter's Grape, of which I now send specimens,

is undoubtedly the best late grape in the kingdom in every respect. It is not sufficiently known at the present time, nor its habits sufficiently understood; added to which there are spurious kinds under cultivation. It is a grape which will endure as much heat as a Tokay, and might be planted in the same house. Still with me they are classed with the Hambros for latest purposes, and have to endure a very moderate temperature; however, I never knew one to shank, and I consider it the safest colouring grape in cultivation. The flavour is moreover exceedingly brisk and rich, and the bloom, when syringing is withheld, is most beautiful. On its own root it is apt to make slender wood, especially for the first three or four years; it is also liable to wither at the point of the growing young wood, at intervals during the growing season, during that period. This, I have no doubt, arises in a considerable degree from the same cause as "shanking," according to my ideas of that evil, as before described. However, as the border becomes more full of roots this evil departs altogether—at least it has done so with me—for those under my care, at first liable to shrivel in the wood, have now been perfectly free from it for years.

I would here beg to recommend those who are inclined to grow the St. Peter's, to graft it on the Black Hambro' stock. This was pointed out to me some years since by the Earl of Sefton's gardener at Croxteth (Mr. Balmer), and I have found his opinion to be correct. Mr. Balmer had pushed the cultivation of this grape to a great extent some twelve or fifteen years ago, and used to produce at that period some of the most splendid fruit I ever saw. Two reasons appear to me to recommend this practice: first, the Black Hambro' root is hardier or better adapted to stand the low ground temperature of this climate; and, secondly, the Black Hambro', through this circumstance, has a later action of root than most other vines, and consequently the berries are longer fed with the ascending current. This is, I think, tolerably manifest from the circumstance of the Hambro', in a mixed house of vines, being the last or nearly so to fade.

The Museats will also, I have no doubt, be found to do better when treated this way, for the same reasons.

Syringing not only may but ought to be dispensed with after the grapes are "set," if a fine bloom is desired; a sufficiently humid atmosphere may at all times be maintained without the syringe. One of the most simple and efficient plans is to enclose the return-pipe, if hot water be used, with a cemented brick trough, with a plug at the end, to empty its contents into a waste-drain when necessary; the top of the cemented trough, of course, left open. As for the arguments in defence of syringing, such as the danger of Red Spider, &c., they will all fall readily before an

atmosphere properly charged with moisture, not variably, but permanently.

The best late grape-growing I ever saw, established on sound principles, was at Colney Hatch—Mr. Crawshay's. Those who are acquainted with that system would do well, in my opinion, to apply it to the growth of the St. Peter's Vine, for late purposes. Mr. C. prunes, as is well known, to the "spur-eyes." Now I know of no vine that will better bear the "close spur" method than the St. Peter's. Mr. C. moreover allows, or rather prefers, two or perhaps three shoots from one pair of "spur-eyes," each with a bunch of half a pound to three quarters, to one shoot with a bunch of double or treble the weight. Small bunches with large berries, well fed and well thinned, are found to keep much better than large bunches; the reason is obvious—the air circulates more freely through the bunch.

I need say little about the "ripening of the wood:" this principle is well known, and I should hope its importance admitted; too much stress cannot be laid on the point, and many are the failures through the neglect or misunderstanding of this very thing.

I am of opinion that what is termed "close stopping" is frequently carried too far; a main leader should in all cases be allowed a good deal of liberty, this being the very thing that produces a fresh volume of root to invigorate the system of the plant for ensuing seasons. I am well aware that it will be said that this militates in some degree against extreme size in the berry. Be it so. I would willingly give up so trifling a point (providing it can be proved) for a more invigorated and permanent system in the vine.

*Oulton Park, near Tarporley,
November 3rd, 1845.*

VII.—*Mode of cultivating the Mango in England.* By Mr. A. Scott, Gardener to Sir Geo. Staunton, Bart., M.P., F.H.S.

(Communicated with specimens of Ripe Mangoes. Sept. 24, 1845.)

In offering the following remarks on the cultivation of the Mango, I may be permitted to observe that in tropical countries it is a magnificent, spreading fruit tree, with very dense, dark shining green foliage. The flowers are produced at the extremity of the branches in upright panicles, whitish, sweet scented, and very numerous; but owing to imperfections in the

stamens and pistil, each panicle only produces a few fruit. On the plant that fruited here, two, three, or four mangoes were on each panicle, of an oval or kidney-shape, about four inches long, their colour olive-green, and when ripe tinged with red on the side next the sun; the skin was thin and tasted of turpentine, but the flesh or pulp which adhered to the stone was delicate, sweet, and not at all stringy, with a rich warm flavour, and without any terebinthine taste.

The Powis mangoes, raised at Walcot, in 1826, are figured and described in the Horticultural Transactions, and in the Gardener's Chronicle Mr. Bond has given an interesting account of the treatment of the plants at Walcot, in 1839.

I therefore hope that the very great interest attached to the successful cultivation of this celebrated fruit may be sufficient apology for my bringing the subject again before the Horticultural Society, as my only object is to encourage others to persevere, believing that we shall experience no real difficulties, although the plant has only ripened its fruit in two English gardens since its introduction into the country about 150 years ago.

I therefore purpose to give a brief account of the treatment of the oldest plant here, and then to point out what we consider most important in that treatment. It was purchased from Messrs. Loddiges and Sons, about four years ago, and was then about three feet high, with two branches. The first and second summer it was kept in the stove until it had made two growths each season; and when the young growths were matured, it was removed to a cooler house to rest for the winter. In the winter of 1843 the terminal or leading buds of the upright shoots were *picked* out, in order to dwarf the plant and fit it for training near the glass (the plants are impatient of being pruned, and the knife should not be used); next spring numerous side branches were produced, almost in a horizontal position, and during that season only one growth was made, and during the winter the plant was treated as in previous seasons, and last March several panicles of flowers were produced, which were succeeded by the fruit, which set very thinly, but when once fairly set, they arrived at maturity in due time. A few weeks previous to ripening they stop growing, and only very slightly change colour. The plant is now in a cool climate, and promises well for another season.

In April, after the fruit was set, it was shifted from a pot of twelve inches diameter into one about eighteen inches diameter, and is now about eight feet high, with a spreading head of about eight yards in circumference.

The stove in which the plants are grown varies in tempera-

ture during the growing season from 65° min. to 85° max., with abundance of moisture. It is heated by hot water in pipes and tanks, and as there is sufficient command of heat, air is admitted freely in mild weather. The plants are wintered in a cool, rather dry climate, varying from 50° or 55° min. to 60° or 65° max. The soil we use for them is composed of about two parts light turf loam, and one part a mixture of peat sand and wood-ashes. We use plenty of drainage, and the pots are not plunged in anything.

What I consider of most importance in the above treatment, is dwarfing the plants, to render them spreading and suitable for training near the glass, and insuring healthy, vigorous growth in summer, and a cool dry climate for the plants to rest in during winter, or until the end of February or March. And owing to imperfections in the blossoms, I would recommend artificial impregnation and a rather dry climate, during the time the plants are in flower.

My experience does not warrant me in stating whether or not imported grafted plants can be depended on for healthy fruiting plants, as no grafted plant has yet fruited in this country; but we know that the fine varieties may be increased by grafts, and also by cuttings.

As the best of the famous mangoes of Bombay are obtained from grafted plants, no doubt but they will also succeed in this country.

VIII.—*The Cultivation of the Starry Dysophyl, a Tropical Annual.* By Mr. T. Moore, gardener to the Earl of Auck-land, Vice-President.

[Two specimens were exhibited at the Society's Meeting, Dec. 2, 1845, and received a Silver Banksian Medal.]

This is a beautiful little pale green annual, found in damp or watery places in the East Indies. It has starry leaves like those of Bedstraw, unbranched stems about a foot high, and cylindrical feathery spikes of brilliant light purple.

Its seeds are sown early in January, in a well-drained 48 sized pot, in soil consisting of peat, loam, and sand in equal proportions, sifted fine, and filling the pot to within half an inch of the top. The soil is watered before being sown. The seed being very small is not covered with soil, but is gently pressed down, a piece of glass is laid flat on the top of the pot, and a pan is placed beneath for future waterings; it is then placed in heat at about 70 degrees. The seed comes up in about five or six weeks, when I

gradually remove the glass, giving all future waterings overhead. As soon as I can handle the young plants I prick them out into small sixties, giving them plenty of water, and placing them near the glass in the orchidaceous house, where I always keep them. In May they are shifted into their blooming pots (thirty-twos or twenty-fours) in light rich soil, consisting of turf, loam, peat, and rotten dung, in equal proportions, with a little sand and charcoal. To the plants grown in the thirty-two, in addition to the above compost, I put a handful of crushed bones over the drainage. After they are well established I keep them saturated with water, and give them manure water twice a week during their early stages of growth. They strike freely from slips placed for a few days under a bell glass in heat. They continue in bloom six weeks or two months, but I have never been able to keep a plant after it has done flowering.

Leigh Park, Havant.

✓ IX.—*Some Account of the Cryptomeria Japonica, or Japan Cedar.* By Mr. George Gordon, A.L.S., Superintendent of the Hardy Department in the Society's Garden.

Few hardy plants are of more importance in England, during winter, than evergreens, more especially those of large dimensions, not only for objects of decoration, but for what is of greater importance in many situations, the providing shelter from bleak winds during the colder portions of the year; and as the Japan Cedar is likely not only to prove hardy, but to form quite a new feature in our landscapes, much resembling the Australian form of Araucaria, a short account of its history and treatment may not be without interest.

The first account we find of the existence of this Japan Cedar is by Professor Thunberg, who, in the year 1784, published its history in his *Flora Japonica*, p. 265, under the name of *Cupressus Japonica*. He states that it is found, both spontaneous and planted, on the mountains of Nagasaki and elsewhere; that the Japanese call it San or Sugi, which, in their language, signifies an evergreen tree, with stiff bristle-shaped leaves; that it is a very tall upright tree, with a pyramidal head, bearing flowers in March; that the timber is very soft, so as to be easily worked, but much used for various purposes, particularly for cabinet work among the Japanese.

Nothing further seems to have been added to our knowledge of this beautiful tree until 1834, when Professor Don published a



Cryptomeria Japonica. 1. An old branch in fruit; 2. A branch of a very young plant.

more technical description, with an uncoloured plate, in the 18th volume of the Transactions of the Linnæan Society, under the name of *Cryptomeria Japonica*. His account was drawn up from the original specimen found in that portion of the Society's Herbarium which formerly belonged to their late President, Sir J. E. Smith, and which he obtained from the younger Linnæus, who had it from his friend and successor Thunberg, after his return from Japan.

Mr. Loudon, in his large edition of the *Arboretum et Fruticetum Britannicum*, merely mentions the tree under the old name, at the end of *Cupressineæ*, upon the authority of Thunberg, and in the last or abridged edition of the *Arboretum Britannicum* omits the name altogether as being very doubtful. No certain account regarding it appears to have been again given, from the time of Thunberg, until the year 1844, when Dr. Siebold, in his beautiful *Flora Japonica*, gave a coloured plate and a detailed account of it, from which I have made the following extracts. He says "that this majestic tree perfectly well deserves the name of Cedar, its name in Japan; that it grows from 60 to 100 feet in height, and 4 to 5 feet in diameter, with a pyramidal shaped head, and rather erect or horizontal branches; that it occurs in great abundance on the three great Isles of Japan, and most probably on the smaller ones; that a tenth part of the forests which cover the skirts of the mountains between 500 and 1200 feet of elevation, is composed of this Japan cedar."

Still nothing was known of the living plants in England, or perhaps in Europe, until Mr. Fortune succeeded in obtaining seeds at Shanghai, in the north of China, for the Society. They reached the Garden in a living state, about the end of May, 1844, and from these the first plants were raised. Since that time an abundant supply has been received by the Society from the same source.

Cryptomeria Japonica is found plentifully about Shanghai, where it no doubt has been introduced from Japan; for naval officers who have been on that station assure us that it is very plentiful in the form of avenues and in groves in the neighbourhood of Shanghai, and in the other northern parts of China, and that it furnishes the principal shelter for the numerous birds during the extreme cold and bleak winds in winter, when the thermometer sometimes falls as low as within 5 degrees of zero. There can be little doubt therefore that it will prove quite hardy in England.

Some idea may be formed of this beautiful tree by imagining such stately objects as the Australian Araucarias, particularly Cunninghamii, with a less aspiring and denser habit, and living in the open air in winter. Indeed the young plants

of *C. Japonica* and *Araucaria Cunninghamii* have so great a resemblance that it requires a practised eye to distinguish the one from the other. The principal difference is, that the *Cryptomeria* has alternate spiral branches, which are rather slender, while those of the *Araucaria* are vertical and placed at regular distances.

This *Cryptomeria* appears intermediate between *Cupressus* and *Taxodium*, differing from the former in a seedling state by having from three to five, but mostly four, seed-leaves, while *Cupressus* has but two; and in its more advanced stages of growth, in its longer, more distant, subulate, incurved, spiral, dark green leaves, and in the cones having fringed scales. From *Taxodium* it is at once distinguished by its spiral subulate leaves unlike those of *Taxodium*, which are flat and two-rowed.

In regard to cultivation, the Japan Cedar seems as easily managed as the common Chinese *Arbor Vitæ*, and like it succeeds in almost any kind of soil or situation which is not very poor or wet.

The seeds, like those of all Conifers, should be sown in a light sandy rather dry loam, and should be placed in a cool situation; when large enough the plants should be potted singly and treated in the usual way, and if properly attended to they will attain a height of from twelve to eighteen inches the first year. It appears to be a very rapid grower.

X.—*On the Propagation of Orchids in India.* By Captain Charles Giberne, Acting Paymaster, S. Division of the Army.

[In a letter to the Vice-Secretary, dated Belgaum (70 miles E. of Goa), October 20th, 1845.]

As I believe the propagation of Terrestrial Orchids to be still a great desideratum with English gardeners, I am induced, on the suggestion of a friend, to detail two or three experiments I have lately made with that view, and in which I have met with some success.

In July I took up a *Platanthera Susannæ* when about three inches high, removed the old tuber, leaving the rest of the root attached to the plant, and then set them separately. In about six weeks the plant had sent down a new tuber, the old one having also, in the mean time, formed a new one which had sent up a single leaf for nourishment. I then broke off from the latter the old tuber a second time, and reset it separately, but on examining

it a few days ago I found it had rotted. Two perfect tubers have, however, been thus formed from one plant; and I do not despair of obtaining three, or even four, another year by removing the old tuber at an earlier period; but the new ones will not then, in all probability, have obtained sufficient size or strength to perfect their flowers till the second or third year.

In the course of the same month, finding that the tuber had rotted off a *Platanthera Susannæ*, I pulled up the stem, cut off the lower end, and reset it. In about a month, the cutting beginning to fade, I took it up and found that a small and perfect tuber had been protruded through the sheath of the stem from the lower joint of the cutting.

I have since made cuttings of two or three stems, leaving two joints on each; but as it is very late in the season, and the plants have only their seeds to perfect, I much doubt if sufficient vitality remains to enable them to put forth fresh tubers, but I intend to try next year before the plants have flowered.

NEW PLANTS, ETC., FROM THE SOCIETY'S GARDEN.

1. *ANEMONE JAPONICA*, *Siebold and Zuccarini, Fl. Japonica*, vol. i., p. 15, t. 5; *Botanical Register*, t. 66, 1845.

Received from Mr. Fortune, from Shanghai, June 20, 1844.

A perennial herbaceous plant, with dark green stems slightly clothed with short hairs. The leaves all grow from the root, on stalks about 4 inches long; they are ternate, with long-stalked, ovate, somewhat heart-shaped leaflets, slightly 3-lobed, and coarsely serrated. The stem is from $1\frac{1}{2}$ to 2 feet high, dividing near the middle into slender branches, one of which is terminated by a single flower, and the three others by a small cluster. At the separation of these branches are three smaller leaves, with very broad short sheathing petioles. The flowers are nearly three inches in diameter, and consist of a considerable number of

bright purple leaves of a somewhat obovate form, and about half an inch wide ; most of them are undivided, but a few have irregular lobes at the side ; those on the outside are smaller, greenish at the back, and covered with silky hairs. The stamens are very short. The pistil is a hemispherical green cushion, composed of very short broad-styled carpels.

It is a green-house plant which will grow freely in a mixture of loam and peat. This species requires an ample supply of water throughout the year. It will doubtless be abundantly multiplied from seed.

This is of considerable importance in consequence of its flowering in autumn, after the generality of green-house plants are over.

Aug. 29, 1845.

2. *BUDDLEA LINDLEYANA*, *Fortune* ; in *Botanical Register*, 1844, No. 25, *Misc.*

Received from Mr. Fortune, November 14, 1843, as a graceful Shrub, with long spikes of beautiful blue or purple flowers, from Chusan.

This is a branching shrub apparently about as large as a Persian lilac ; with smooth four-cornered winged branches, which when very young are clothed with a minute rusty down. The leaves are opposite, ovate-lanceolate, taper-pointed, coarsely toothed, quite smooth, bright green and wrinkled on the upper side, paler beneath, with short stalks. The flowers are dull violet, scentless, about an inch long, arranged in erect one-sided racemes about 6 inches long, and covered with minute clusters of crystalline glands, which give them a downy appearance. The calyx is a very short, obtusely four-toothed cup. The corolla is between tubular and funnel-shaped, with an erect four-lobed, obtuse border, which is much darker coloured than the remainder of the corolla. The anthers are linear, nearly sessile, and arranged in a ring below the middle of the tube of the corolla.

This plant grows luxuriantly out of doors in almost any sort of soil, and is hardy enough to stand mild winters without protection ; but whether or not it will flower freely there remains to be determined. It blooms pretty well in a greenhouse, especially where it can be planted out. It is easily propagated from cuttings in the usual way. As a conservatory plant it appears to be important, and should it flower as freely out of doors as it does in China it will be a very desirable shrub.

Aug. 27, 1845.

3. *FICUS VIRGATA*. *Roxburgh, Flora Indica*, vol. iii. p. 530.

Raised from seeds from the North of India; presented by the Honourable Court of Directors of the East India Company.

In general appearance this shrub resembles the common eatable fig, but it seems to form a much smaller bush. The young shoots, leaves, and fruit are covered with fine short hairs. The leaves are roundish-ovate, from 3 to 4 inches long, regularly serrated all round, except at the very base, and seated on taper stalks rather less than half their own length; they are slightly wrinkled on the upper side, but very much so on the lower. The figs are seated on short stalks, have a pear-shaped figure, and seem to be as large as the fruit of the sorb; usually they appear singly, but in some instances two have grown from the same axil.

A deciduous shrub, capable of withstanding an ordinary winter, if planted in a dry situation. It was killed to the ground by the last severe winter. It grows freely in any good garden soil.

It has no beauty as an object of cultivation, and is only interesting as a distinct half-hardy species.

August 30, 1845.

4. *ABELIA RUPESTRIS*.*

Received from Mr. Fortune, June 20th, 1844, as a fine dwarf shrub, found amongst rocks on the Chamoo Hills.

A small spreading bush, with deciduous, bright green foliage. The branches are very slender, covered with fine down, and deep reddish brown, when fully exposed to the sun. The leaves are opposite, ovate, distantly serrated, on very short stalks, quite smooth except at the midrib on the underside, where they are closely covered with short hairs. The flowers are pure white, something like those from the honeysuckle, and come in pairs from the axils of leaves belonging to the short lateral branches. At the base of the ovary stand 3 very small bracts. The ovary itself is slender and downy; surmounted by a calyx of 5 obovate ciliated sepals, which are slightly stained rose-colour, and rather

* *A. rupestris*; ramis pubescentibus, foliis ovatis distanter serratis glabris subtus secus costam villosis, pedunculis bifloris, involucro nullo, sepalis 5 obovatis ciliatis, corollâ pubescente 5-fidâ, staminibus exsertis.—J. L.

membranous. The corolla when expanded is half an inch long, funnel-shaped, downy, with a spreading border of 5 convex ovate blunt equal lobes, beyond whose tube extend 4 smooth filaments.

The plant is distinguishable from *Abelia chinensis* of Brown, by its want of involucre, smooth leaves, and not trichotomous flowers; and from the *Abelia serrata* of Zuccarini and Siebold, by its 5-leaved calyx.

It has hitherto been treated as a greenhouse plant, but will probably prove hardy enough to stand out of doors in mild winters. The soil which appears most suitable is rough sandy loam, mixed with a little peat. Being of free growth, an ample supply of water is necessary during the summer season. In winter nothing different from the general treatment of greenhouse plants is required. It is propagated from cuttings of young wood, in the usual way.

From its being sweet scented, and the length of time it remains in flower, this will be of considerable importance as a greenhouse plant; and should it prove hardy, it will doubtless be a good addition to the shrubbery in consequence of its flowering in autumn.

August 18, 1845.

5. *CATTLEYA MAXIMA.* *Lindley, Gen. & Sp. Orch.*, p. 116.

Received from Mr. Hartweg July 2, 1842. He found it on rocks and trees near Rio Grande de Melacatos, in Equatorial America.

The pseudo-bulbs are from 6 to 8 inches long, compressed, and considerably thicker at the upper than the lower end, with a few shallow furrows on each side. The leaves are single, of the same length, very regularly oblong, and rather concave until they become old. The flowers are 7 inches across, and two in number, on the end of a peduncle a few inches longer than a compressed pale green spathe; but Mr. Hartweg reports that they are really much larger, and grow as many as 4 or 5 in a cluster. When they first expanded they were of nearly the same colour as those of *Cattleya intermedia*, but after some days the colour brightened and deepened till at last it was equal to that of *Cattleya labiata*. The sepals are lanceolate and convex; the lateral ones twisted and turned backwards; the dorsal one still more convex, and curved gracefully upwards from the base of the column. The petals are about 2 inches broad, spreading forwards on each side of the lip, and after a time become beautifully painted with purple veins. The lip is about 3 inches long, undivided; at the lower half flat and channelled, so that its edges meet over the column and form a ridge there; the anterior half

gradually spreads into an oblong plate, very much curled and toothletted ; its ground colour is a very pale pink, over which is drawn a coarse network of the richest crimson veins. Along its middle a narrow yellow polished line is drawn, and forms a beautiful contrast with the crimson veins that surround it. There is no trace of ridges, glands, or elevated lines upon any part of the surface of the lip.

This requires to be treated in a similar way to the different species of *Cattleya*, cultivated in almost every collection : rough peat and potsherds are apparently the best materials for potting it in. During summer an ample supply of water is necessary at its roots, but as little as possible on its leaves, except in the form of steam. Mr. Hartweg states that it requires a temperature of 75°. In winter, if the atmosphere is kept moist, very little water will be necessary for a few weeks.

It is a very fine addition to our orchidaceous plants, more especially should it continue to flower in autumn.

Oct. 1, 1845.

6. WEIGELA ROSEA.*

North of China, Mr. Fortune. Native name "Noak-chok-whoa."

"A shrub like a *Philadelphus*; old stems whitish, smooth; young ones green, slightly winged; wings alternating with the leaves and covered with hairs; leaves opposite, nearly sessile, elliptical, $1\frac{1}{2}$ inch wide, 3 inches long, serrated above, nearly smooth below, on the midrib and veins hairy; flowers axillary and terminal, 3 or 4 springing from each axil or end of the shoot, rose-colour; peduncles short with green short thread-like bracts at the base; calyx cleft into 5 unequal segments, 3 above and 2 below, 2-lipped, smooth, light green; corolla monopetalous, tubular; mouth reflexed and cleft into 5 equal segments, smooth; stamens 5, shorter than corolla, and inserted or growing to its sides; smooth above, but hairy from the point of union to the base of the corolla; style 1; stigma capitate, a little longer than the stamens; germen inferior, rather more than an inch long, nearly sessile, and having the appearance of part of the peduncle of the flower."

Such is Mr. Fortune's description of this most beautiful shrub,

* *W. rosea*; ramulis petiolis foliorum costis ovariiisque pubescenti-hirtis, foliis brevissime petiolatis oblongis acutis acuminateisque basi rotundatis argutè serratis supra glabris, floribus sessilibus axillaribus terminalibusque 1-3, ovario petiolo pluries longiore, calyce pilosiusculo, corollæ pubescentis tubo obconico limbo patulo regulari laciniis rotundatis, filamentis glabris.—
J. L.

which has reached this country in safety, is apparently hardy, has already been distributed by the Society to a limited extent, and promises to take rank with the Chinese Azalea as an object of ornament. A drawing received from him represents it as forming loose clusters of from three to five flowers at the end of every little side branch, and his dried specimens show that the drawing is faithful in that respect. The flowers are rather more than an inch long, and are an inch and a half in diameter when expanded. In colour they are very like the well-known Chinese Crab (*Pyrus spectabilis*), pure white under, deep rose externally.

The genus *Weigela*, which originated with the Swedish traveller Thunberg, has been referred by modern botanists to *Diervilla*, and several species of it inhabiting Japan have been published by Messrs. Siebold and Zuccarini under that name. But although in many technical characters it approaches that genus, yet it is very different in habit; and since the seed-vessel is crustaceous, not membranous, and the seeds winged, not wingless, it seems expedient to preserve the original genus.

The species now described is more like the *Calysphyrum floridum*, also a *Weigela*, and a most beautiful one, from the North of China, than any of the *Diervillas* of Siebold and Zuccarini, from all which it differs in its very large flowers, except their *D. grandiflora*, the leaves of which have very long stalks and the stamens hairy filaments.

Hitherto this plant has been kept in a greenhouse, but it has so much the appearance of a hardy shrub that, especially considering its flowering in the North of China in the month of April, it will probably live in the open air.

7. *PTEROSTIGMA GRANDIFLORUM*, *Bentham, Scroph. Ind.*
p. 21. *Hooker and Arnott, Botany of Capt. Beechey's Voyage*, p. 204, t. 45.

Received from Mr. Fortune, July 30, 1843, from Hong Kong, as an herbaceous plant, with blue flowers, growing on hill sides and near streams.

In its wild state this plant does not appear to grow more than a foot or 18 inches high; but in gardens it has become more than 3 feet high, the consequence of which is that its natural beauty has been greatly impaired. It is a perennial, covered all over with slender spreading hairs. The stems are round; the leaves are opposite, stalked, ovate, crenated, very much marked with sunken veins, and deep green. The flowers, which are nearly as large as those of a *Digitalis*, and of the deep colour of *Gloxinia violacea*, grow singly in the axils of the leaves, than

which they are considerably shorter. Their calyx appears to consist of 7 narrow green leaves, imbricated at their base, but the number varies to 8; they form a complete broken whorl, and may be understood to consist in part of bracts which stand close to the true sepals, and become blended with them; of these the 3 exterior are both broader and longer than the others. The corolla is tubular, 2-lipped, with the upper lip broad, ovate, blunt, and notched, while the lower is composed of 3 smaller divisions placed nearly on the same plane; in this respect however the flower varies, some of the specimens having 4 lobes in the lower lip. The usual number of stamens is 4, of which 2 are perfect and next the upper lip, and 2 stunted, of the same length but more slender, and belonging to the lower lip; when an additional lobe appears in the lower lip of the corolla it is accompanied by an additional sterile stamen. The perfect anthers are constructed in an unusual manner; at the end of the filament is a large globular green gland, which eventually shrinks up; upon this green gland are planted 2 lobes of unequal length, bursting longitudinally. The style and stigma too are of a singular form, the former gradually widening and flattening upwards till it ends in a thin broad plate which curves forward and forms a stigma on its anterior edge.

This species has been treated as a stove plant, but will probably prove hardy enough to stand in a greenhouse. It appears to grow freely in almost any sort of soil, especially sandy peat. In summer an ample supply of water is necessary, and shading in sunny weather. In consequence of its being subject to damp off in winter, it will require to be kept rather dry for a few weeks. It is very easily multiplied from cuttings in the usual way. Should this species flower abundantly, it will be a good addition to our stove plants.

Sept. 8, 1845.

8. BRASSICA CHINENSIS, Linn.

Received from Mr. Fortune, Nov. 23, 1844, as the Shanghai oil plant. It is grown over the whole country round that city for oil.

Stems slightly glaucous, two or three feet high, not much branched, quite smooth. Lower leaves on long stalks, cordate-ovate, slightly running down the petiole; upper leaves amplexicaul; all of them blunt, and perfectly undivided. Flowers bright yellow. Calyx smooth, erect. Pods $2\frac{1}{2}$ inches long, arranged in racemes $1\frac{1}{2}$ foot long, rather compressed; valves with many longitudinal meshes for the veins, and a slightly

prominent dorsal line ; terminated by a point about half an inch long. Seeds in a single row, spherical, the size of mustard, deep purplish brown, about the colour of ill-ripened turnip seed, with scarcely any pungency when bitten. These pods are produced in very great abundance, and each contains about 30 seeds.

It is a hardy annual which will grow freely in almost any sort of soil. The seed should be sown in April, in a sheltered situation, then in May the plants may be planted out where they are to remain, allowing 2 feet between each plant.

This appears to be of no importance in a horticultural point of view. It may be cultivated by farmers for feeding cattle, or it may be grown for the same purpose as it is in China.

Aug. 22, 1845.

9. INDIGOFERA DECORA.*

Received from Mr. Fortune, May 1, 1845.

A dark-green handsome bush, with somewhat glaucous branches. The leaves are pinnate in from 2 to 5 pairs and an odd one, quite smooth on the upper side, but slightly covered on the under side with very fine hairs, attached by their middle ; the leaflets are exactly ovate, with a short bristle at their end, between $1\frac{1}{2}$ and 2 inches long, of a very dark green colour ; and to each pair there are two short bristle-like stipules. The flowers grow from the axils of the leaves in horizontal racemes much shorter than the leaves themselves ; they are of a light rose colour and very handsome. The calyx is a flat membranous 5-toothed cup, with the two upper teeth very far apart. The standard of the corolla is oblong, nearly flat, very slightly keeled behind, nearly white, but pencilled with delicate crimson lines near the base ; in length it is equal to the wings and keel, and forms with them an angle of about 45° when expanded ; the wings are narrowly lanceolate and ciliated, of a pale bright rose colour ; the keel is rather paler, and bordered with a woolly or very downy upper edge.

It is a greenhouse plant which will grow freely in almost any sort of soil, especially sandy peat. In summer an ample supply of water is required, and air at all times when the weather is favourable. To prevent the leaves from being scorched by the sun, it will be necessary to use shading. In winter water should

* *I. decora* ; fruticosa, glabra, glaucescens, foliis pinnatis, petiolis 2-5-jugis exactè ovatis obtusis cum mucrone subtus pilis sparsis peltatis obsitis, racemis densis foliis duplò brevioribus, calyce plano membranaceo 5-dentato, vexillo oblongo, carinae margine superiore villoso.—J. L.

only be given when the soil becomes dry. It strikes freely from cuttings under ordinary treatment.

This is a good addition to our greenhouse plants.

Aug. 18, 1845.

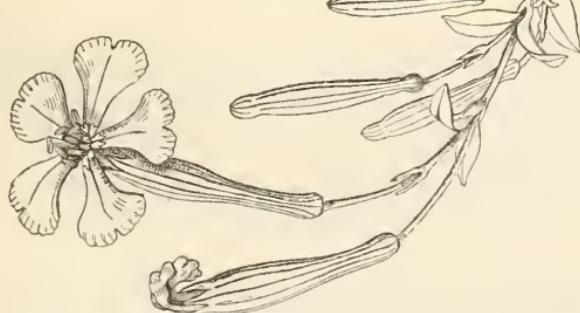
10. *SILENE SCHAFTA, S. G. Gmelin, in Bulletin Mosqu.,*
xii. 397; *Walpers' Repertorium*, i. 276.

Transmitted by Dr. Fischer, from the Botanic Garden, Dorpat; and from M. Vilmorin, Paris, in April, 1844.

This proves to be a beautiful little herbaceous plant, producing a great number of spreading slender downy stems, which form compact tufts, and are terminated near the extremity by 4 or 5 bright purple flowers more than an inch long. Of these flowers that at the extremity of the shoot opens first, and those below it one after the other in succession, so that the branches are by degrees covered all over with blossoms. Its stems do not rise above six inches high, and render it well suited for bedding out, or for cultivating among collections of alpines, or for rock-work, over which it will bend gracefully.

It appears from the work of Walpers that this species inhabits rocks on Mount Keridach, in the Russian province of Talytsch.

It is a hardy perennial, which grows freely in any light rich soil. It is increased by seeds, which are produced freely, and flowers from the end of June to October: the young plants



from seed will not bloom before the second season.

This species must be regarded as a very handsome little plant, and very desirable on account of its blooming profusely and for a long time in the autumn.

Sept. 19, 1845.

11. *STATICE FORTUNI*, *Lindley in Bot. Register*, t. 63, 1845.

Sent from Chinchin by Mr. Fortune; found growing in sandy soil near the sea.

This is a plant with the manner of growth of the Tartarian Sea-Lavender. The root is perennial. The leaves are all radical, glaucous, spathulate, with 3 principal veins, about 5 or 6 inches long. The stems in their wild state are not more than 8 or 9 inches high; but when the plant is produced in a greenhouse, they become as much as 2 feet high. They are bright green, much branched, angular, and entirely leafless. A few of the lowermost have occasionally no trace of flowers: the latter grow in short, close, one-sided racemes. The bracts are oblong, convex, bright green, with a broad membranous margin; each produces about 3 flowers. The calyx has pale green ribs and a white plaited border. The corolla is bright pale yellow, consists of 5 emarginate petals joined at the base into a very short tube, and projects a little way beyond the calyx.

It will probably prove a hardy perennial, and if so, it will be very suitable for bedding out in a flower garden. When grown in pits or frames, it becomes drawn and unsightly, but if planted out in sandy peat, it does not seem to grow above a foot high. It will doubtless be abundantly multiplied from seeds.

Aug. 26, 1845.

12. *CALYSTEGIA PUBESCENS*.*

Raised from a small portion of the root found in a dead Paeony root, in Box No. 22, from Mr. Fortune's mission in China. The box was sent from Shanghai, and stated to contain a plant of the double Convolvulus, which was supposed to be dead when received at the Garden in June, 1844.

This curious plant approaches very nearly to the *C. sepium* or larger bindweed of our English hedges, from which it differs in

* *C. pubescens*; caule volubili pubescente, foliis oblongis acutis hastatis pubescentibus lobis baseos angulatis, pedunculis angulosis unifloris, bracteis ovatis ciliatis margine reflexis.—J. L.

having firmer and smaller leaves, much narrower bracts, and a fine pubescence spread over every part. It is the first plant



of its order that has been mentioned as producing double flowers. They are about as large as those of a double Anemone, but the petals are arranged with the irregularity of the Rose ; they are of a pale very delicate pink, and remain expanded for some days. The calyx is quite unchanged. The exterior petals are very much lacerated and irregular in form ; those next the centre are narrow, drawn together into a kind of cone ; the next central are completely concealed by those without them, and diminish till they are mere scales, analogous to those which may be found in the first buds which burst in the spring. Not a trace can be found of stamens or pistil.

It is probably quite hardy if planted in a dry situation. It requires a rich loamy soil, and is easily increased by the roots. The roots very much resemble those of the common bindweed (*Calystegia sepium*). It flowers freely in July and August. It is a very handsome climbing plant, with large double flowers, which are produced freely.

Sept. 19, 1845.

13. THE SHANGHAI HAN-TSI.

This was received along with the following variety from Mr. Fortune, who states on the packet of seeds collected at Shanghai, that it is "probably different from the Chusan variety, not appearing to grow so strong." This has proved to be the case; and although it can only be considered a variety of that next to be mentioned, yet it is much inferior. The leaves are smaller and more pointed, and the plant seeds more abundantly.

It may, perhaps, improve by cultivation: or, as it seeds plentifully, it may prove hardier after repeated sowings; otherwise, it ought to give place entirely to the Chusan variety.

14. THE CHUSAN HAN-TSI.

Seeds of this vegetable were dispatched in a letter sent by Mr. Fortune, dated Chusan, September, 1844, and received at the Garden January 9th, 1845.

Mr. Fortune states that it is "a vegetable used as spinach by the Chinese. This variety grows strongly, and ought to be sown in beds or rows rather thinly."

It proves to be the *Amaranthus oleraceus* of Linnæus.

Stems erect, from 2 to 3 feet high, channeled, pale green; branches nearly round; leaves oval, cuneate at the base, 3 to 4 inches broad, and 5 to 6 inches long when well-grown. Petioles slender, 2 to 3 inches in length, of a still paler green than the stems. Flowers axillary, crowded, pale green.

It requires to be grown in a very rich light soil and a rather moist temperature of about 60°. If proper accommodation can be afforded the seeds may be sown at any time, and the leaves will be fit for use in two months after. Some plants were put out in June, on a warm border, but did not succeed. At the first gathering, the tops may be cut off, and fresh leaves will be thrown out, but they will be smaller than those first produced.

A few leaves of sorrel improve the common spinach. The Han-tsi possesses in itself a very slight but agreeable acidity



The Chusan Han-Tsi.

which renders the above addition unnecessary. It is to be regretted that it is not yet sufficiently hardy to succeed out of doors; but it can be easily cultivated in pits or in pots in any forcing house, and thus afford an additional variety to the culinary list even in winter.

15. *RHYNCHOSPERMUM JASMINOIDES*. *Lindley.*

Collected at Shanghai, by Mr. Fortune.

This is a slender climbing evergreen shrub, rooting along its



branches, wherever it touches a damp surface, like ivy. When wounded, its branches discharge a milky fluid. The young shoots are slightly downy; the leaves opposite, oval, deep green, quite smooth, sharp pointed, with minute scale-like glands in

the place of stipules. The flowers are white, deliciously sweet scented, and produced in small irregular corymbs on the ends of peduncles considerably larger than the leaves. Their calyx consists of 5 narrow smooth convex sepals, rolled backwards, and much shorter than the tube of the corolla, with a very shallow toothed glandular ring surrounding the base of the latter. The corolla is about three quarters of an inch long, pure white, salver-shaped, contracted in the middle of the tube, with a partially spreading border, whose 5 divisions are wedge-shaped, truncate, and twisted obliquely. The anthers are 5, arrow-headed, placed just within the orifice of the tube, and separated by 5 slightly elevated hairy lines. The ovary consists of 2 separate carpels, and is surrounded by 5 oblong green emarginate hypogynous scales, which sometimes are slightly united at the edge.

The structure of this plant is not precisely that of the genus *Rhynchospermum* as given by M. Alph. De Candolle, for the scales beneath its ovary are not exactly united into a cup. But they are partially so; and as there is no other difference as far as can be ascertained from the plant in a state of flowering only, it may be referred to the genus. In habit it is more like an *Aganosma*, but its corolla has not the tapering lobes of that genus, nor do the nectary or stigma correspond with it.

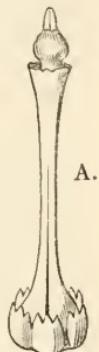
Aug. 5, 1845.

16. *SEDM KAMTCHATICUM*, *Fischer and Meyer*, *Ind. Seminum in Horto Petropolitano*, *Walpers' Repertorium*, ii. 262.

Received from Dr. Fischer, in June, 1844, and said to have been collected by Dr. Schrenk on the Chinese limits of the South of Soongaria.

This is a handsome herbaceous plant, with bright yellow flowers like those of *Sedum Aizoon*, which it much resembles in habit. The leaves are obovate and toothed at the upper half only, but they narrow in a wedge-shaped manner to the base. They are red edged, and the stem has also a strong stain of that colour; most of them are alternate, a very few only near the summit being opposite to each other.

It is a hardy perennial, requiring a light soil and dry situation. It is easily increased by cuttings any time during the summer or autumn, and flowers from June to August.



A. Hypogynous Scales and Pistil of *Rhynchospermum jasminoides*.

It proves to be a fine showy plant for Rockwork, where it blooms freely and remains long in succession.

Sept. 19, 1845.

17. *OPHIOPOGON PROLIFER.**

Received from T. Lewis, Esq. of Penang, July 12, 1844.

This is an evergreen herbaceous plant, with a slender stem slowly rising by means of roots which its leafy stems throw out, in the manner of a screw pine. The stems are not thicker than a swan's quill, and bear at intervals clusters of bright-green sword-shaped leaves, which curve downwards and are longer than the flowering stems. The latter are bright purple, and bear in an interrupted manner a few clusters of nearly sessile small white obovate flowers, whose texture is between fleshy and spongy. In this species the stamens are united in a very short fleshy ring. The ovary is very thin skinned, and adheres, but does not grow, to the perianth. In each of its 3 cells stands a pair of fleshy ascending anatropal ovules. The style is pyramidal and terminated by 3 small point-like stigmas.

It is a stove plant, which appears to succeed well in rough sandy peat. During summer an ample supply of water is necessary; also a very moist atmosphere, at a temperature of not less than 80° by day. In winter it requires to be treated almost like an orchidaceous plant: if a humid atmosphere is kept up, little or no water will be required for a few weeks.

It appears to be an abundant flowerer, and is of some interest to those who delight in curious stove-plants.

Oct. 1, 1845.

18. *GRAELLSIA SAXIFRAGÆFOLIA*, *Boissier, Ann. Sc. Nat.*,
xvii. 172. *Cochlearia saxifragæfolia*, *De Cand. Sys.*,
ii. 370.

Obtained from the Dean of Manchester in April, 1844.

The seeds were collected on the Mountains of Persia, by Th. Kotschy, and received as a species of Cabrera.

This is a little plant, with long-stalked kidney-shaped or roundish leaves, very coarsely notched, and smelling strongly of garlic. The flower-stems are about nine inches high, and bear

* *O. prolifer*: rhizomate radicante scandente, foliis recurvatis glaberrimis ensiformibus racemis spicatis interruptis longioribus, bracteis ovatis margine membranaceis floribus obovatis sublongioribus.—J. L.

a compound corymb of small white flowers resembling those of the common seury grass. It has not produced any fruit.

It is a hardy perennial, growing freely in any good rich garden soil, and well suited for planting on rockwork. It flowers in July and August, and is easily increased by dividing the old plants in autumn or spring, or by seeds: the plants raised from seed will not flower before the second season.

It must be considered a good hardy plant for rockwork, and rather showy, as it flowers abundantly.

Sept. 19, 1845.

2.147

M E M O R A N D A.

DESTRUCTION OF INSECTS.

Shore's Remedy.—Mr. E. C. Shore,* who was recommended to the Society as a person in possession of the means of destroying insects, was permitted to experiment on various plants in order to test the efficacy of the substances which he employed. Every facility was afforded him; but he found that success did not correspond with his expectations, for the plants were killed or greatly injured in many instances, although the insects were not. The red spider on peach trees was killed, but the shoot died next day. The turnip flea was not killed by a powder sprinkled over the plants.—ROBERT THOMPSON.

In the Hothouse Department eight common plants of various sorts were selected. The substance was used in a pounded state, and the plants were dusted over with it; also dissolved in water and applied with a syringe. This was done by Mr. Shore in my presence. In a few hours after its application, if strong enough to kill the insects, it destroyed the plant also. In every case it proved a failure.—JAMES DONALD.

Chamomile, for destroying scale on plants, has been tried, at the recommendation of Sir C. M. L. Monck, Bart., F.H.S. The Chamomile in a green state was suspended among the branches attacked by the scale; but no alteration could be perceived, nor was the least effect produced upon the insects. To ascertain whether or not Chamomile water possessed the power of destroying scale and other insects on plants, the Chamomile was infused in boiling water, and when cold applied to the plants with a syringe. No difference could be perceived. No scale was destroyed.—JAMES DONALD.

Corrosive Sublimate, to destroy aphides and other insects.—This was dissolved in water, and applied to the plants with a syringe. The insects were killed instantaneously; but, when the solution was made strong enough to kill insects, it destroyed the plants also.—JAMES DONALD.

Naphtha, Whisky, Oil, as remedies for the scale.—These substances were all tried separately to different plants; applied with a camel-hair brush, and

* The following was the advertisement circulated by this person:—

"The Proprietor is in possession of the means for the certain Destruction of the above noxious Worm, and other Insects, which so often blight the hopes of the Agriculturist, by the very heavy loss occasioned to the green crops, both Wheat, Turnip, Cabbage, &c. The Proprietor having made various experiments with most respectable individuals, is confident the preparation will perform that which he has above stated, and that the quantity of 1 cwt. mixed with double the quantity of Sand or light Mould, to the Acre, will be all that is required."

used in similar quantities. The leaves and branches which were thus dressed with oil perished in a few days; those to which naphtha and whisky were applied were apparently uninjured. Oil destroys both scale and plants; whisky and naphtha destroy mealy bug while in an active state, but has no influence over the eggs of the insect.—JAMES DONALD.

Spirit of Wine, to destroy scale, mealy bug, &c., has been tried. The spirits were applied to the plants with a camel-hair brush. In twelve hours afterwards the part where the spirits had been applied became a brown spot, and if they were diluted with water so as not to injure the plant they had no effect on the insects. This mode of destroying insects cannot be applied with safety; if strong enough to destroy them, it also destroys the plants.—JAMES DONALD.

Sulphuretted Hydrogen Gas.—Some plants were put into a close box in which the gas was given off. Ten plants of different sorts were subjected to this treatment; some were dry when put in, others wet, but all were well syringed with soapsuds immediately after they were taken out. It was found by experiment that six hours produced the same effect as forty-eight. In every case the insects were destroyed, but the following table shows that this process is injurious to the plants.

Name.	Condition.	State.	Time in the Box.	Remarks.
Pelargonium	Growing	Dry	Hours. 48	Dead when taken out
Ditto		Wet	48	
Dodonæa triquetra . . .		Dry	48	
Echinocactus . . . .		..	24	
Primula sinensis		Wet	12	
Ditto		Dry	12	Dead when taken out
Bletia sp.	Dormant	..	12}	
Jasminum Sambac . . .	Growing	..	12	Very much injured
Mammillaria discolor . . .		..	6	
Canna indica . . . .		..	6	
Opuntia ferox . . . .		..	6	Dead when taken out
Euphorbia splendens . . . .		..	6	

Meyer's Composition.—A Composition for destroying cockroaches and other insects was sent to the Garden by Mr. G. H. Meyer, its inventor. The substance in every respect resembled pounded gum arabic. It was, according to the directions of Mr. Meyer, laid down at night in dry places which the insects frequented, and taken up in the morning. It is impossible to say whether or not any insects tasted it. When exposed to a humid atmosphere, it became like gum; moths, beetles, woodlice, ants, &c., &c., were found to live for days in a vial beside it. The experiment was a failure.—JAMES DONALD.

Hereman's Dilutium.—A small vial containing a liquid “Vegetable Dilutium,” for destroying mealy bug and other insects, having been sent to the Garden by Mr. S. Hereman, its inventor, the following trials were made with it. According to his directions, the liquid was applied to the plants with a camel-hair brush, and when thus dressed they were well syringed with pure water. The plants on which it was tried were Berberis tenuifolia, Olea fragrans, Epidendrum cochleatum, and Mammillaria gracilis. In a few days after its application Mammillaria gracilis died, and all the other plants were more or less injured. In every case the mealy bug was killed, and also many of the white scale, but apparently none of their eggs, as they appeared as numerous as ever in a few weeks afterwards.—JAMES DONALD.

Kyle's Liquid.—A liquid for destroying mealy bug and other insects, invented by Mr. Brown, Chemist, Layton, having been sent to the Garden by Mr. John Kyle, the following trials were made. As recommended by him, the liquid was applied with a camel-hair brush to Begonia undulata, Epidendrum cochleatum, and a Mamillaria. The plants were apparently uninjured. In every case the insects were killed.—JAMES DONALD.

A Composition for destroying scale on pines having been sent to the Garden by Robert Dymond, Esq., whose gardener was the inventor, the following trials were made with it. The composition, being like black paint, was diluted with water, according to the donor's directions, and applied to the plants with a brush. Not having pines to operate upon, common stove and greenhouse plants were substituted. The plants were rendered unsightly until the old leaves dropped off, the substance being of such a nature as not to wash off by syringing with clean water. The young leaves soon became covered with scale like those which were dressed with the liquid. In this case very few of the insects were killed; and although they had been destroyed, the remedy proved worse than the disease.—JAMES DONALD.

Spirit of Wine, in the form of vapour, has been tried to destroy scale and other insects on plants. The plant experimented upon was put into an empty water-tub, and covered up close to retain the steam; a small vessel full of hot water was placed beside the plant, over which a cup was placed containing the spirit. In this operation six hours seem to be about the time required. The quantity of spirit should be in proportion to the space intended to be filled. For a common water-tub, if the spirits are good, a wine-glass full is quite sufficient. Several Orchidaceous plants have been cleaned by this process without being in the least injured.—JAMES DONALD.

THE BLACK PINE BEETLE. (*Hylurgus piniperda.*)

If a small portion of sulphur is dusted over the young shoots of pine-trees infested with this insect, it prevents the beetle from eating the centre out of the young shoots; but it requires to be applied two or three times in the season, particularly after heavy rain. It preserves the young shoots from the ravages of the *Hylurgus* without in the least injuring them.—GEO. GORDON.

TRANSMISSION OF BULBS FROM INDIA.

Bulbs, experimentally prepared for a voyage to England, were received from India by the Court of Directors of the East India Company, and sent to the Garden for examination. One half of the bulbs were simply wrapped in cotton and packed in brown paper, while the other portion (of the same kinds of bulbs) was encrusted in a kind of white wax, and covered with cotton like the others. When received at the Garden, in June, 1844, those bulbs which were simply packed in cotton and brown paper had emitted roots on the journey, and the tops in most cases had grown considerably, while those coated with wax remained quite firm and as fresh as when first packed; although, according to the statement on the outside of the parcel containing them, they must have been confined in the wax three months. The bulbs transmitted in cotton began to grow first, but soon showed symptoms of debility; while those sent in wax did not move much before a month after they were potted, but then they grew strong and healthy. In one or two cases the bulbs perished in the cotton, while the same kind packed or coated in wax survived the journey.—GEO. GORDON.

ASPHALTED FLOWER STAKES.

It having been stated that Seyssel Asphalté would prevent dahlia and other

stakes from decaying under ground, the following experiment was tried. Stakes thoroughly dry, and consisting of birch, elm, ash, hazel, &c., were coated with boiling asphalte sufficiently high up to allow for one foot being above the surface of the ground. The portion of the stakes just above the ground soon began to decay, and by the end of the season all were quite rotten. This application proves injurious. Some of the stakes treated as above mentioned, and not driven into the ground, rotted in the same manner. That portion of the stake which is under ground and covered with the asphalte decays faster than when driven into the ground without any such preparation.—GEO. GORDON.

BURNETTIZED LINEN.

Some coarse canvas which had been Burnettized, so as to be guarded from injury by damp, had been prepared as a shading of a hot-house; but in consequence of the heating apparatus in the house being insufficient, the shading was used as a covering in winter as well as a shading in summer. Other shadings which had not been Burnettized were used at the same time for the same purpose. In twelve months the Burnettized canvas became so rotten as scarcely to bear its own weight when drawn up. As to durability, no difference in this case could be perceived between canvas which had been Burnettized and that which had not.—JAS. DONALD.

MR. HOARE'S VINE COLUMNS.

Growing vines, according to Mr. Hoare's plan, as published in his work on the cultivation of the Vine in the open air, is there stated to be a mode which, from its simplicity and economy, and its easy practical adoption, recommends itself most especially to the notice of a vast class of persons who are not in possession of any of the usual methods of culture. The mode is further said to be based on two important principles connected with the growth of the vine. The *first* of which is, that a body of substances or materials, enclosed in hollow brickwork erected *on* the surface of the ground, will nourish and support the roots of a vine inserted therein, as effectually as it would do were the materials placed *below* the surface of the ground. The *second* principle is, that the roots so enclosed will strike upwards and grow as freely in that direction as they will *downwards* or horizontally in materials *beneath* the surface of the earth. Numerous inquiries with regard to this mode having been made by visitors to the Garden, it was ordered by the Garden Committee that it should be properly tried. Accordingly, two hollow circular columns were erected on a square base of brickwork, above which the columns were raised 5 feet high; their diameters being each 3 feet. These columns were for holding materials for the roots, and for circularly training the vines. They were filled with *lime-rubbish*, *broken bricks*, charcoal, and bones of half-inch description: these four substances were in equal proportions, well mixed, and then soaked with the drainings of a cow-house. In March two healthy vines, one the Black Prince, the other the Royal Muscadine, were taken out of pots and planted with the stem protruding through a circular opening in the second course of bricks from the base. A piece of old woollen-cloth steeped in soap-suds was placed under and over the roots; a portion of the materials was then filled in, and the remainder when the full height of the columns was attained. In short the whole proceeding was in strict accordance with the letter of Mr. Hoare's instructions. The result was, neither of the plants pushed into leaf, and both died in the course of the summer.—ROBERT THOMPSON.

ORIGINAL COMMUNICATIONS.

XI.—*On the Influence of Electricity on Vegetation.* By Edward Solly, F.R.S., F.L.S., Hon. Memb. Royal Agricultural Society, Experimental Chemist to the Horticultural Society, etc.

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The powerful influence which Heat and Light exert on vegetation might naturally lead us to expect that Electricity, the third great form of physical power, would also produce some effect on the growth of plants, and play an important part in the economy of vegetation. This idea has for the last hundred years been a favourite one with naturalists, and many experiments have from time to time been made with the view of ascertaining its truth. The following pages contain brief accounts of the most important of these investigations.

Attention was first drawn to the influence of electricity on growing plants about the middle of the last century, just before the beautiful discoveries of Dr. Franklin proved the identity of lightning with ordinary electricity of friction. Everything connected with the effects of this extraordinary power was at that time of great interest, the recent discovery of the Leyden jar having attracted general attention; and, accordingly, the effects of electricity on vegetation were examined with eagerness by electricians in all parts of Europe, and led to much animated correspondence and discussion.

The earliest experiments on the subject recorded appear to be those of Dr. Maimbray, of Edinburgh, made in the autumn of 1746; he electrified two myrtles during the whole month of October, and found that they put forth small branches some inches in length, and even came into blossom—an effect which did not happen to other myrtles which were not electrified, and he consequently attributed the phenomenon to the influence of electricity. At this time M. l'Abbé Nollet, one of the most distinguished of the French electricians, being occupied with experiments as to the effect of electricity on the passage of fluids in capillary tubes, and on the rate of evaporation from various organic substances when under the influence of electricity, was struck with the importance of Dr. Maimbray's experiments, and was accordingly led to repeat them himself. In the preceding year (1745), M. Boze, Professor of Physique at Wittemberg, had observed * that water issuing from a vessel in minute drops

* Mémoires de l'Académie des Sciences, 1745, pp. 119, 133.

would pour out in a continuous stream when the vessel was electrified. The cause of this curious phenomenon was investigated by Nollet, who found that although a much larger quantity of fluid appeared to issue from the aperture when electrified than had previously done, yet in truth, except when the tube was very minute, the velocity of the stream was hardly at all accelerated. Whilst occupied with these experiments, he heard of those made at Edinburgh by Dr. Maimbray, and consequently naturally thought that the effects he had been studying in capillary glass tubes might have some connexion with the circulation of the sap in plants, and hence produce the increased growth which had been observed by Maimbray. His first experiments were made on fruits, green plants, and moist sponges, which, after careful weighing, were electrified for four or five hours, and then weighed again; he invariably found that evaporation had been considerably augmented by the action of the electricity. He next proceeded to electrify seeds and young growing plants.* In October, 1747, he took two small wooden bowls filled with exactly the same kind of earth, and in all respects alike, and sowed with similar mustard seed; forty-eight hours afterwards the one bowl was placed in connexion with the electrical machine and electrified for six hours, whilst the other was kept in the same room, but at a distance from the machine; after two days several of the seeds in the electrified bowl had come up, whilst no alteration had taken place in the other; the following day, nine of the electrified seeds had come up, none of the non-electrified seeds; and this superiority was kept up, the bowl being electrified every day for more than a week, when the plants in the former were ten inches high, those in the latter not more than a quarter of an inch. This experiment he repeated, and varied in different ways, by taking other seeds, &c.; the same results were always obtained. The electrified plants, however, generally appeared rather weaker than those which had not been electrified.

In England, the experiments of Maimbray appear to have excited less interest. A paper by Mr. Browning was read before the Royal Society, in 1747, on the effects of electricity on vegetables,† in which he describes his own experiments as well as those of a Mr. Baker, who electrified a myrtle at the Duke of Montague's, at Ditton; but their observations are entirely confined to the divergence of the electrified leaves, and the beautiful appearance of the aura proceeding from the points of the leaves when

* Mémoires de l'Académie, 1748.—Recherches sur l'Electricité, 1749,
p. 342.

† Phil. Trans., 1748.

seen in the dark : besides these, no further experiments appear to have been made in Britain, but the Edinburgh experiments of 1746 were repeated and extended in France, Switzerland, Germany, and Italy. At the same time that the Abbé Nollet was making the above-mentioned experiments, and even some months previously, Professor Jallabert, of Geneva, was occupied with the same subject, and had, independently of Dr. Maimbray, arrived at very nearly the same conclusion as that naturalist. In the months of April and May, 1747,* M. Jallabert regularly electrified various plants two hours every day, exposing them to the open air after the operation, and found that all of them, and in particular a carnation, grew rapidly, and flourished remarkably ; he however did not feel quite sure that the difference which he observed between these plants and others not electrified was due to electricity. The successful experiments of Maimbray and Nollet encouraged him to continue his investigations, and led to curious results. In the autumn of 1747 M. Jallabert electrified bulbs of hyacinth, jonquil, and narcissus, which were beginning to grow in glasses of water ; they were placed on cakes of resin, connected by wires with the conductor of the electrical machine, and kept in an electrified state for eight or nine hours a day ; those which were electrified grew more rapidly, the leaves were larger, and the flowers opened sooner than others not electrified. By weighing the bulbs and vessels of water in which they grew, he ascertained that the electrified bulbs gave off more moisture in a given time than the other plants did. He also repeated the experiments of Nollet on mustard and cress, and obtained similar results ; and attributed all these effects to an augmentation in the movement of the sap, caused by electricity, and analogous to that observed by Boze, as taking place in capillary tubes.

Professor Boze, of Wittemberg, also made experiments on this subject in 1747,† the results of which he communicated to the Abbé Nollet ; he electrified several different kinds of plants and shrubs, the growth of which invariably appeared to be accelerated. Similar results were obtained the following year by the Abbé Menon, of Angers, who, in a letter to M. de Réaumur, states that by the aid of electricity he had been enabled greatly to facilitate the growth of offsets of ranunculus, even in the depth of winter. M. Nuneberg, of Stuttgart, was also occupied with experiments on the influence of electricity on vegetation : he took two boxes, each containing five bulbs, in all respects alike,

* *Expériences sur l'Electricité*, 8vo. Genève, 1748.

† *Comment. novus de Electric.* 10.

and electrified the one box ; the plants grew far more rapidly than those in the other box ; their relative size, after eight days, being as eight to five.

From this period, for more than twenty years, very few experiments on this subject are recorded, and we find it only occasionally referred to by writers on electricity : thus, for example, in 1752, Mr. J. Freke, in his curious treatise on the Nature and Properties of Fire, quotes experiments on the influence of electricity on the leaves of the sensitive plant, the irritability of which was then by many considered of electrical origin. He also hazards a few remarks on the probable effect of electricity generally on the growth of plants, and on their reproduction in particular, evidently considering electricity as the great moving power of animated beings, and identical with nervous influence. Priestley, in his 'History of Electricity,' 1768, after describing the experiments of Maimbray, Nollet, and Jallabert, supposes that the expense of such investigations has prevented other electricians from repeating and extending them, and observes that the subject is one of great interest, and well deserving further examination. The only method by which this can be done, he observes, is by the help of a machine for perpetual electrification, to go by wind or water ; he does not appear to have made any experiments himself, but seems perfectly satisfied with the correctness of the experiments of the French and Swiss electricians. Professor Sigaud de la Fond, of Montpellier, in speaking of the effects of electricity on organised substances,* and after describing the experiments of Nollet, mentions some of his own, which had led him to the same conclusions ; he found the bulbs of hyacinths, when electrified, grew faster and formed more healthy plants than if not electrified. The probability of electricity having a close connexion with the growth of plants is also suggested by Duhamel,† who points out the effects of stormy weather on vegetation, and supposes that electricity may be directly concerned in those remarkable atmospheric changes which are observed to affect plants in so marked a manner. These views are still further carried out by G. Beccaria, Professor of Natural Philosophy at Turin.‡ He observes that electric clouds begin to appear in the spring when vegetation commences, and from time to time moisten the young plants with electric rains : this electricity of the clouds is found to increase as the season progresses, till the middle of autumn ; to be most abundant in those showers which are accompanied with lightning, after which

* 'Traité de l'Electricité,' 1771, p. 374. † 'Physique des Arbres,' 1758, vol. ii.

‡ 'Elletricismo Artificiale,' 1772, p. 283, 4.

plants of all kinds are known to grow with remarkable vigour. He however attributes even more marked effects to a constant but feeble electric condition of the earth, which he conceives promotes vegetation on a large scale, just as feeble artificial electricity has been proved to do in various experiments. Similar observations are also made by the Abbé Mann, 1774.*

In 1773 the Abbé d'Everlange de Witry communicated to the Brussels Academy of Sciences a paper on the influence of electricity on the fluids of vegetables.† After speaking of the effect of electricity on fluids moving in capillary tubes, and quoting the experiments of Nollet and Jallabert, he expresses surprise that the views deduced from their results have not been more generally adopted, and attributes this to the contrary results obtained from imperfect experiments on diseased or unhealthy plants; he appears to have no doubt that electricity does affect the circulation of the sap of plants as well as that of the blood in animals, and enters at some length into the subject of its application in the cure of disease. The same year, M. l'Abbé Bertholon communicated to the academy at Beziers some observations on the influence of meteors, lightning, and the rain of thunder-storms, on the germination of seeds and growth of plants.

An announcement was made in 1775, by C. H. Koestlin, in his 'Dissertatio physica experimentalis de Effectibus Electricitatis in quædam corpora organica,' that negative electricity was detrimental to vegetation; both animal and vegetable life being retarded by negative electricity. This appears to be the first distinct observation as to the different influence of negative and positive electricity, as the preceding experiments seem all to have been made with positive electricity alone. The following year M. Bertholon read before the Academy of Sciences at Paris an account of a series of experiments on the conducting power of plants for electricity, in which he showed the great differences which exist between different plants, those, generally speaking, being the best conductors which were the most succulent or contained the largest quantity of moisture.

In 1779, the Count de Lacépède,‡ in his book on Electricity, describes some experiments which he had made on vegetables, observing that invariably, on electrifying a plant, he found it grow, or increase, with more vigour than usual, and that the germination of seeds, and sprouting of bulbs placed in water, was always hastened in a very decided manner by electricity. The

* Mémoires de l'Académie de Bruxelles, t. ii. p. 1, 46.

† Ibid., t. i. p. 181.

‡ Essai sur l'Electricité Naturelle et Artificielle, tome ii. p. 166.

same year a naturalist in London determined to repeat the original experiment of Dr. Maimbray,* and accordingly electrified a myrtle for many hours a day for some time, in the middle of December; the result was that the tree formed buds, and threw out small branches in a very remarkable manner.

Dr. Marat described in 1782† some experiments which he had made on the germination of electrified seeds; from which he draws the conclusion that it exerts powerful influence on the fertility of the soil. Six porcelain vessels filled with moist earth, and each containing lettuce seed, were prepared in all respects alike; three were placed in a very large glass jar well insulated, whilst the others were placed in an adjoining room also insulated. The temperature in both rooms being two degrees above the freezing point, and all other circumstances alike, the jar was kept constantly electrified seventeen hours a day for a fortnight. On the seventh day the plants began to make their appearance in the electrified vessels; and at the end of the fortnight they were as forward as similar plants sown on the same day, but kept in a room nine degrees above the freezing point. In the three vessels which were not electrified the seeds had not begun to germinate.

The next important addition to our knowledge of the electricity of vegetation was by the Abbé Bertholon. This philosopher having paid much attention to the subject, and made numerous experiments, published the results of his inquiries in his book ‘*De l’Electricité des Végétaux.*’‡ The first subject treated of in this work is the influence of atmospheric electricity upon growing plants, which the author endeavours to prove in various ways: first showing the constant presence of free electricity in the air, he proceeds to argue that so powerful an agent must produce some effect upon plants, and then goes on to describe the effects which are produced by lightning and other phenomena of atmospheric electricity. In these chapters the influence of electricity on the general productiveness of crops is asserted, and several remarkable instances are adduced in confirmation of the author’s views: thus, for example, he states, on the authority of M. Vyssery, that in the year 1780 the hops failed in certain districts, and it was observed that there was very little lightning; whilst in the following year there was an excellent crop, and lightning was remarkably abundant: many other statements of a similar nature are also given. The great conducting power of water, its presence in the atmosphere,

* *La Nature considérée*, p. 89.

† *Recherches Physiques sur l’Electricité*, p. 359.

‡ Paris, 1783, 8vo.

and in all growing plants, is then shown ; and lastly the effects produced by artificial electricity are described, and compared with those which are observed in nature. In the second part of the book, the effects produced by electricity are more minutely examined. The experiments of Nollet and Jallabert are described and confirmed by Bertholon's own results ; he observed in addition, that interrupted electrification appeared to have more influence than when continued, in accelerating vegetation. On the growth of leaves and flowers, he quotes the experiments of Maimbray, Nollet, Jallabert, and also Muschenbroek, who had arrived at the same results as these philosophers. This part concludes with some curious chapters on the colours, odours, and tastes of fruits and flowers, on the development of which he thinks that electricity exerts a very remarkable influence. Fruits nearly ripe on being electrified were found to acquire the odour and taste of ripeness sooner than others not electrified ; and flowers or plants just coming into blossom arrived sooner at perfection, and the colours were more brilliant than is ordinarily the case ; when plants in flower were electrified the blossoms were observed to become more brilliant in colour, and of a richer and more delicate tint, than other flowers of the same kind of plant. All these experiments were made with positive electricity, and there is accordingly a chapter specially directed to the consideration of the effects produced by negative electricity ; these are, for the most part, the reverse of those produced by positive : germination is retarded, the growth and formation of the leaves is checked, the development of fruit and flowers, and the secretion of colouring and odorous matters, is impeded ; and these effects, he states, may be observed by experiments on the small scale as well as by carefully watching the electric condition of the atmosphere on a large scale.

The third and last part of M. Bertholon's book contains the practical applications of those principles which he endeavours to deduce from experiments and theoretical reasoning ; namely, the means of increasing the natural supply of electricity to plants, when it is deficient ; the means of diminishing it when too abundant ; the application of electricity in protecting plants from the attacks of those insects to which they are liable, and in preserving them from the effects of various diseases. For the first of these objects he proposes an instrument which he calls an electro-vegeto-meter, which consists of a well-insulated pointed conductor, attached to a high wooden pole firmly fixed in the ground, and well connected with a number of metallic points placed points downwards, on a suitable support above the surface of the ground, and so arranged that the series of points being connected with the upright conductor by a chain, may be carried

over any part of the garden or field. An apparatus of this kind he had placed in the middle of a garden, and found it produced favourable effects on the plants growing below. He says of it, "This instrument is applicable to all kinds of vegetables, to all places, to all weathers, and its utility and efficacy can only be questioned or doubted by those timid persons who are not attracted by discoveries; who never enlarge the barriers of science, but remain for ever confined in the narrow boundaries of a cowardly fear which they frequently qualify with the name of prudence; a name, however, which no longer answers their purpose. If I may believe my enlightened friends, the electro-vege-to-meter is one of the most beautiful and most useful discoveries which has been made this century."

In order to increase the natural supply of electricity, he also proposes to water them with electrified water; for this purpose an insulated stool or stand is required, upon which the gardener stands, bearing in his one hand a chain connected with the positive conductor of a machine, whilst in the other he holds a syringe to throw the water into the plants to be electrified, or in place of a syringe he may merely hold a common watering-pot, and if the insulated stand be placed on wheels it may easily be so arranged that the gardener can supply a large extent of plants with electrified water. Lastly, he proposes to electrify the whole cistern or basin of water which serves for irrigation, by a powerful electrical machine, the cistern being lined with resin, to insulate the water.

In order to diminish the natural quantity of electricity when there is too much in the air, he proposes to water the plants frequently, as thus becoming better conductors they will more readily discharge the superabundant electricity of the air; and secondly to place pointed metallic conductors, well connected with the ground, in the immediate vicinity of the plants to be protected. M. Bertholon attributes the increase and development of certain insects, which feed on plants, to the agency of electricity, which he says exerts the same influence upon them as upon the seeds of plants; and accordingly proposes to kill them by an excess of electricity; passing the shocks of Leyden jars through the trunks of trees in which the larvae of insects are deposited: this plan he found to answer well on repeated trials, and provided the shock was not too powerful, the tree was not injured. All the ordinary diseases to which plants are subject may, he thinks, be diminished, counteracted, or entirely cured by a judicious and appropriate application of electricity: after describing the modes in which this may be done, he says, "the diseases of plants are not so numerous as those of man; plants have no diseases of the mind—none of those mental ills which

destroy us so cruelly. Never troubled by fear, never tormented by ambition, or devoured by *ennui*, without being a prey to the sad effects which arise from these evils, they fulfil their peaceful and happy destiny. The accidents which afflict them are the necessary consequences of those destructive causes with which the world is filled ; but fortunately not possessing that imagination which torments us so ingeniously, and those passions which tyrannize over us, they are exempt from that numerous army of evils and maladies of all kinds which assail us on every side. They have none of those spasms or vapours, those deliriums or insanities which we so frequently create ; again, the remedies which are applied to them are more efficacious : and often by the strength and goodness of their constitution, even without the assistance of human industry, they surmount the obstacles which would have vanquished them."

The number of new experimental facts adduced by M. Bertholon in this curious book is comparatively small, and it is easy to see that his enthusiasm and lively imagination frequently carried away his judgment, and caused him to view facts in a very questionable light whilst collecting arguments in support of his favourite views. He, however, made the first attempt to collect and arrange the electrical phenomena of nature, and the results of the experiments of electricians, in a methodical and systematic form ; pointing out the manner in which electricity may probably be the real cause of many of the unexplained phenomena of vegetable and animal life.

Immediately after the publication of Bertholon's work, another treatise appeared on the same subject by Gardini, of Turin ; and likewise papers bearing upon the influence of electricity on vegetation, by Achard and De Saussure. The last of these* was, in fact, little more than a favourable critique of Bertholon's book, and an expression of his own conviction that electricity is the great moving power of vegetable life—the agent which influences their development and growth. The observations of Achard are contained in several essays : on the electricity of rain, snow, and hail ; on electrifying fluids ; on germination, &c. ;† and likewise in papers on the influence of electricity on the growth of vegetables, in which he confirms the results of preceding philosophers ; and on the influence of electricity in promoting the fermentation and putrefaction of vegetable and animal matters. He found that both negative and positive electricity accelerated the

* De Saussure, sur l'Electricité des Végétaux. Rozier, 1784, ii. p. 290.

† F. C. Achard, Physicalische und Chemische Abhandlungen, vol. i. p. 784.

putrefaction of animal matter, and caused barley and other fermentable substances to pass into spirit with increased rapidity.*

Gardini's book, 'De Influxu Electricitatis atmosphæricæ in vegetantia Dissertatio,' &c., 1784, contained similar views to those entertained by Bertholon, and some further applications of the theory to the good or bad crops of different years. He, in particular, quotes the year 1783 as being remarkable for the abundant crops obtained in all parts of Europe, whilst the previous year had been as remarkable for a deficiency: this superiority of the year 1783 he attributes to the abundance of atmospheric electricity, which was unusually strong, whilst the preceding season had been noted for the absence of electricity.

About fourteen years before, Professor Gardini had stretched across the garden of a monastery at Turin a number of iron wires, for the purpose of some experiments on atmospheric electricity. After a short time the garden, which had hitherto been remarkably productive, began to fail, the plants became unfruitful and withered away, and the monks, attributing this change to the influence of Gardini's wires, took them down; when, after a short time, the plants began to revive again, and the garden was soon as productive as before. Gardini explained this, on the supposition that the wires deprived the plants below of that natural supply of electricity which was necessary to their healthy growth.

About this time Dr. Ingenhousz, of Vienna, had published a translation of Dr. Franklin's theory of electricity, in which he spoke rather slightingly of the views of those who attributed such great influence to electricity in accelerating the growth of plants; and, in general, expressed his belief, after mature consideration, that if not altogether deceived, they had at all events very greatly exaggerated the effects of electricity on vegetation. This statement drew the attention of Professor Schwankhardt, of Vienna, who persuaded Dr. Ingenhousz to repeat with him the experiments which had led him to a conclusion so decidedly opposed to the generally received opinion; an account of these investigations was published by Schwankhardt in 1785.† The following is an outline of them:—a piece of cork about three lines in thickness, and covered with a piece of blotting paper, was placed floating in a glass full of water, and on it were placed sixty mustard seeds; the glass was then placed at the bottom of a cylindrical glass jar, eighteen inches high and four in diameter, coated inside and outside with tin-foil, like an ordinary Leyden

* Memoiren der Berl. Acad., 1783.

† Rozier, Journal de Physique, 1785, ii. p. 462.

jar. Four of these jars were prepared, the same number of seeds being placed in each, and care being taken that they were all exposed to exactly the same circumstances, only that two were kept constantly electrified by connexion with the positive conductor of a powerful machine, whilst the other two were untouched ; the seeds all came up alike, and there was no difference in the time of germination or in the size of the young plants. The same result was obtained on repeating the experiment, two being positively and two negatively electrified. Other seeds being placed on cork floating on water, and directly connected with the positive or negative conductor of the machine, germinated as under ordinary circumstances. These experiments were varied in several different ways, the same effect, however, being always obtained ; and hence M. Schwankhardt became convinced of the truth of Dr. Ingenhousz' observations, and agreed with him in believing that though it might probably exert some influence on growing plants, yet it was unjust to conclude that the effects described by previous electricians were due to its agency. They repeated many of these experiments exactly, with cress seeds and various bulbs, and obtained such conflicting and uncertain results that they could not come to any definite conclusions. Amongst others, they carefully repeated M. Comus's experiment on the sensitive plant, described by Bertholon,* and satisfied themselves that the effects produced were purely mechanical, in which they were borne out by the Count de Caleppi and Professor Landriani of Milan, though the latter still continued to hold the old views respecting the great influence of electricity on vegetation.†

This paper of Schwankhardt was opposed by Dr. Duvarnier,‡ who, without adding any new facts, contented himself with throwing out doubts as to the accuracy of the experiments of Ingenhousz and Schwankhardt, referring at the same time to the numerous experiments of other electricians. Dr. Ingenhousz also published some observations on the subject,§ in which he confirms the statements of Schwankhardt, repeats his own doubts of the accuracy of previous experiments, and states his belief that the effects observed by former electricians were due to the agency of light, and not of electricity. He describes experiments, in which seeds, placed on the bottom of Leyden jars sixteen inches high and seven and a-half in diameter, and compared with similar seeds equally shaded from the light, but not electrified, showed no superiority of growth whatever. These experiments, how-

* Bertholon, *Électricité des Végétaux*, p. 264.

† Ingenhousz, *Expériences sur les Végétaux*, ii. p. 264.

‡ Rozier, 1786, i. p. 98.

§ Ibid., 1786, i. 81.

ever, of Dr. Ingenhousz, so far from strengthening his position, in truth prove nothing whatever : because, as is well known, the interior of a charged Leyden jar contains no electricity whatever ; and therefore, in placing seeds in the inside of a jar, he placed them in a situation of all others the worst for the influence of electricity on them. Electricity always tends to occupy the outer surface of substances, and consequently is found entirely on the outside of any piece of metal, whether it be solid or hollow ; in the Leyden jars the electricity of the two coatings is powerfully drawn together, and accordingly the charge wholly exists on the surfaces of the tin-foil in contact with the glass, the outside of the interior tin-foil, and the inside of the outer foil, and this holds good whether the jar contain only air, germinating seeds, or mercury, &c. ; it is indifferent what matter is placed inside the jar, the whole of the electricity is collected on that side of the tin-foil which is in contact with the glass. For this reason it is evident that Dr. Ingenhousz's experiment did not establish the points which he endeavoured to prove : his results were, however, confirmed by Sylvestre, who described a number of experiments in the ' Mémoires de la Société d' Agriculture de Paris, pour 1791,' and by Paets, Van Troostwyck, and Krayenhoff, in their ' Application de l'Electricité à l'Agriculture et à la Médecine.' These philosophers found no difference occasioned in the germination and subsequent growth of seeds ; or if any difference whatever was perceptible, it was in favour of the seeds which were not electrified. The first experiment which they made was in favour of the effect of electricity ; but, on repeating and varying it, they came to the same conclusion as that at which Ingenhousz had arrived.

In 1788 Dr. Ingenhousz published some observations on the influence of atmospheric electricity on the growth of plants,* in which he further examines some of Bertholon's statements, and particularly with regard to some cases of rapid growth in the neighbourhood of lightning conductors, which Bertholon had attributed to the influence of electricity. The most important case of this sort was one communicated to Bertholon by the Abbé Toaldo.† M. Quirini, some years since, had had a lightning conductor constructed at his beautiful country seat on the banks of the Brenta. This apparatus, consisting of a high pole, surmounted by a bar of iron which reached considerably above the roof, was placed in an angle of the walls at the back of the house, on the northern aspect ; by these walls M. Quirini had a row of

* Rozier, 1788, i. p. 81.

† Bertholon, de l'Electricité des Météores, Lyons, 1787, vol. ii. p. 370.

wild jessamines planted, in order to shelter the house on that side from the action of the moist northern winds. He found, after a few years, that the two plants nearest to the lightning conductor had increased with most extraordinary rapidity, having reached to the roof of the house, a height of thirty feet, whilst the other trees, which were cultivated with exactly the same care, were not more than four feet high. This fact Bertholon considered as a most decisive proof of the truth of his views, and as unquestionably the effect of the lightning conductor : a conclusion denied by Ingenhousz, who contrasts it with the statement of Gardini respecting the monks' garden at Turin. The importance of electrical rains he doubts, because plants grow well in hot-houses where they never get any electrified water ; and besides, he remarks, the greatest quantity of atmospheric electricity is not always apparent during the height of summer ; snow, in fact, being often far more electric than rain. Ingenhousz repeated Gardini's experiment with the wires across a garden, in one case covering the plants with a complete network of cross wires, but failed in observing any effect whatever on the plants growing beneath. He also connected small pointed conductors with a number of different trees in the garden, but found no increase in their growth in consequence ; in fact, the most healthy tree of all seemed to be one to which no pointed conductor happened to have been applied. These experiments were also made at the same time by Herr van Breda, at Delft, in Holland ; he found that horizontal wires suspended over plants produced no effect on their vegetation, and a similar result attended the case of pointed conductors attached to the tops of trees.*

These statements, coming from so careful and accurate a philosopher as Dr. Ingenhousz, soon brought the theory of electro-culture into complete discredit, and even some of its warmest advocates began to change their opinions : it was not long, however, before other naturalists took up the subject ; and accordingly, in the two following years we find a number of papers by different authors upon the effects of electricity on vegetation. In November, 1788, M. Carmoy wrote a letter to the Marquis de Vichi,† in which he describes a variety of experiments, of which the following will serve as an example :— He took three perfectly similar cylindrical vessels of tin-plate, and filled them with fine sifted dry earth, upon the surface of which he placed in each vessel three similar grains of wheat, taken from the same ear ; he then surmounted each vessel with

* Voigt's Magazin fur Physik, 6, iv. 76.

† Rozier, 1788, ii. p. 339.

a ring of tin-plate three lines in depth; the additional space in each was then filled up with the same sifted earth, and the whole very gradually and carefully moistened with an equal quantity of water: they were then all three placed on insulated stands, in exactly the same relation to light, and one being electrified positively, and the other negatively, the third was left untouched. After twenty-three days the young plants were measured, when it was found that the unelectrified had grown 11 inches 10 lines, the positive 18 inches 5 lines, and the negative 19 inches 9 lines. A number of other experiments of the same kind are also given, the general result of which is that electricity appears to accelerate germination, negative electricity being more powerful than positive.

Similar experiments also are described by M. Rouland,* but the results which he obtained are opposed to those of Carmoy. He electrified porcelain dishes of water, in which corks floated, supporting common cress-seed; these were electrified both positively and negatively by contact with the conductors of the machine, or charged Leyden jars, yet in no case could he observe any effect produced by the electricity. A few months later M. l'Abbé d'Ormoy† published the results of a very extensive and laborious set of experiments, undertaken with a view of ascertaining whether the objections of Ingenhousz were sound or not, and the results of his experiments appear to have corroborated those of Nollet and of Bertholon. He electrified mustard and lettuce seed for several days in moist earth, and found their germination always accelerated. Besides these he made other experiments in which seeds were electrified for some hours, and then sown and compared with other seeds which had not been electrified; in these cases also the electrified seeds had always the start of the others, and so beneficial did he find it to germination that he says even old and dry seeds which appeared spoiled, and would not germinate, did so readily when previously electrified for some hours. Almost the same results were published by Bertholon at nearly the same time.‡ He enclosed parcels of seeds in tin-foil and kept them constantly electrified for some days before sowing, when he found that seeds so prepared germinated remarkably soon; these experiments were made with seeds of spinach, endive, turnip, &c. He likewise describes a number of experiments in which he found seeds to germinate sooner when placed on the plate of a charged electrophorus.

Professor Vassalli, of Turin, in a Dissertation published 1788,

* Rozier, 1789, i. p. 3. † Ibid., 1789, ii. p. 169.
‡ Ibid., 1789, ii. p. 401.

endeavoured to prove that the experiments of those who electrified seeds or plants in deep jars were not to be depended upon, because in such arrangements evaporation would be checked: the results of his experiments were in favour of the beneficial influence of electricity. In a later paper* he still maintains the same opinion, and states, as his belief, that electricity assists in giving to growing plants their green colour.

The last writer of any note who published observations on this subject was M. de Rozières, by whom there are two long and carefully detailed papers in Rozier's 'Observations sur la Physique.'† After this the all-absorbing questions of European politics seem to have diverted the attention of naturalists from the discussion, and, when the return of peace allowed the followers of science to pursue their studies again, new trains of investigation arose, new and brilliant fields of inquiry were everywhere opening to view, and the older and less interesting subjects of inquiry were neglected and almost forgotten. The discovery of voltaic electricity, and the brilliant discoveries which it led to, completely eclipsed the hitherto favourite study of frictional electricity. M. de Rozières entitles his papers 'Essai sur cette Question—Quelle est l'Influence de l'Electricité sur la Germination et la Végétation des Plantes?' They contain numerous experiments on chervil, wheat, beans, rye, peas, mustard, radish, lettuce, trefoil, &c., the result of which was, that nearly in all cases the electrified plants came up first, grew larger, and had longer roots than the others; "the leaves were more numerous, larger, and of a decidedly more beautiful green." The results of these experiments, which occupied M. de Rozières from 1786 to 1790, confirmed the truth of the original experiments of Nollet and Jallabert, and proved that the view taken by Ingenhousz was incorrect, and that the effects in question were not results of imperfect experiments and due to the unequal influence of light, but were really caused by electricity, as those philosophers had stated. In this view he was also borne out by the experiments of Mr. Bilsborrow in 1797, who found germination decidedly accelerated by positive electricity, and still more by negative.

A. von Humboldt, in his masterly 'Aphorismen aus der Chemischen Physiologie der Pflanzen,' 1794, observes that there is hardly any problem on which the learned are more divided than respecting the influence of electricity on vegetation. He evidently himself believes that it has considerable effect on vege-

* Giornale Scientifico, t. iii. † Rozier, 1791, pp. 351-65 and 427-46.

tation, but at the same time does not attribute to it those very marked effects described by Bertholon; shrewdly remarking, when speaking of the influence of thunder-storms and electric rains on plants, that the effects observed cannot be wholly produced by electricity. Senebier, in his '*Physiologie Végétale*', 1801, after referring to the various statements of different authors, observes, that it appears to him more probable that electricity does not favour vegetation than the contrary; he however admits that the question is by no means decided. A similar view of the subject is taken by De Candolle, whose experiments led him to attribute little effect to the action of electricity on plants.

A number of experiments were made early in the present century, and shortly after the discovery of voltaic electricity, to ascertain its influence upon various organic substances; but there appear to be no recorded experiments on seeds or growing vegetables before 1806, when Davy published some interesting observations on the subject.* He observed that seeds placed in pure water in the positive part of the circuit, germinated much more rapidly than under ordinary circumstances; but that in the negative part of the circuit they did not germinate at all. In explanation of this experiment he remarks that without supposing any peculiar effects from the different electricities the phenomenon may be accounted for from the saturation of the water near the positive metallic surface with oxygen, and that near the negative one with hydrogen; though at the same time he does not think it impossible that some effect may be due to the electricity. Davy also describes some experiments in which growing plants were made the medium of connexion between the two extremities of the battery: in one case, a plant of mint was soon killed, but another, after ten minutes, remained uninjured; lime and fixed alkali was found at the negative extremity, whilst chlorine and sulphuric acid had collected at the positive extremity of the battery.

The experiments of Davy were received by Du Petit Thouars† as evidence of the great influence of electricity on vegetation. He believed that plants contained two distinct galvanic arrangements; one acting vertically through the woody fibres, the other horizontally through the medullary rays: to the influence of these opposite but independent currents he attributed the principal phenomena of vegetation. Observations on the influence

* *Philosophical Transactions*, 1807. *Elements of Agricultural Chemistry*, p. 37.

† *Essais sur la Végétation*, 1809, ix^e Essai.

of electricity of low tension in exciting the irritability of plants, the movement of the stamens of the barberry, &c., were published in 1812* by Nasse. The views of Du Petit Thouars on the immediate connexion of electricity and vegetation were supported by Gasc in 1813;† he, however, did not add any new experimental evidence of much value.

The subject of atmospheric electricity, one of the most important branches of the science, had attracted a great share of the attention of electricians ever since the discoveries of Franklin; but although many observations have been recorded and many experiments made, yet the theory of its source, even at the present time, is very far from being complete. In 1825 M. Pouillet read before the Academy of Sciences at Paris two Mémoirs containing the results of his investigations into the sources of atmospheric electricity.‡ This philosopher proved, that during the germination of seeds a notable quantity of electricity is disengaged. Setting aside all consideration of the more complicated changes which take place during germination, we may consider it as a mere process of oxidation, the whole effect produced on germinating seeds by the air being the abstraction of a portion of carbon and the formation of a quantity of carbonic acid gas; a change therefore analogous to the combustion of carbon, and consequently one which we might expect, like that, would give rise to the evolution of electricity. M. Pouillet's experiments though delicate are very simple: he took twelve glass capsules, about nine inches in diameter, well varnished them with lac, and then placed them in two rows, side by side, on a table covered with the same varnish; they were then filled with vegetable earth, and well connected by metallic wires with each other and with the one plate of a condenser. Seeds having been sowed in the capsules, the apparatus was examined from time to time; for the first two days no signs of electricity whatever were given by the gold-leaf electrometer connected with the condenser, but on the third day, when the plants began to appear above the surface of the earth, the electrometer indicated negative electricity, and this effect continued to be observed, night as well as day, for more than a week. It is evident from this experiment that electricity being set free during germination, the seeds become negative, whilst the carbonic acid given off is, of course, positive—a very important conclusion, if established; both in respect to the source of atmospheric electricity, and likewise as connected with the

* Gilbert's Annalen der Physik, xli., p. 393. Göppert, Ann. des Sci. Nat., xv., p. 72.

† De l'Influence de l'Electricité dans la Fécondation.

‡ Annales de Chimie et de Physique, t. xxxv. p. 401; et t. xxxvi. p. 1.

probable influence of electricity on germination. It has, however, been suggested, that as all vegetable soils contain carbonaceous matters which are continually undergoing oxidation, carbonic acid is constantly being found in the soil, under precisely the same circumstances as those under which it is found during the germination of seeds.

A number of valuable experiments on the influence of electricity of low tension on germination have been made by M. Becquerel. On causing seeds to germinate under the influence of feeble galvanic currents he observed that those in contact with the copper element of the circle grew faster, whilst those in contact with the zinc element grew less rapidly than similar seeds placed on glass; the negative extremity increasing, the positive retarding germination. Similar results were obtained with bulbs which, were placed on small frames of zinc and copper, connected together in water; those on the negative frame being found to grow sooner than those on the positive. In these experiments electricity was employed to assist in forwarding the ordinary chemical changes necessary to germination, the plants themselves being in fact regarded as acting like the negative termination of an ordinary voltaic arrangement.* The favourable influence of negative electricity of low tension on germination is attributed to the decomposition of saline substances, and consequent evolution of alkaline matter, which assists germination by combining with and neutralising the acetic acid always evolved during germination and the growth of bulbs and buds. M. Becquerel also fully considers the action of atmospheric electricity on vegetation.† After observing that the earth and atmosphere are always, under ordinary circumstances, in opposite electric states, the equilibrium between which is constantly being restored by the agency of mountains, plants, and animals, he states that the chemical effects produced by these currents of electricity favour or retard vegetation according to their direction. In the ordinary state of the atmosphere it contains free positive electricity; the plants therefore are negative, and consequently must manifest an acid reaction on their surface; and hence, under these circumstances, the electricity of the atmosphere must facilitate vegetation by assisting the vital force. In the consideration of this part of the subject M. Becquerel also inquires into the influence of electricity on the phenomena of endosmose and exosmose—effects of heterogeneous affinity, dependent on the attraction of two different fluids for each other, and their power of wetting and

* Ann. de Chimie et de Physique, lii. p. 240.

† Traité Expérimentale, iv. 157—210.

penetrating the pores of the substance which separates them. The interesting experiments of Porret and Dutrochet are described, and the conclusion drawn, that though electricity is one of the causes of these phenomena, it is not the only one, because the effects produced are often in the opposite direction to what would be the result of mere electric action. It appears evident that M. Becquerel does not acknowledge any influences of electricity on vegetation, except those which it produces in facilitating or retarding chemical action.

Among those who have devoted much time and attention to the study of electricity, and its influence on vegetation, the names of Mr. Pine and Mr. Weekes ought not to be omitted. Numerous papers by these gentlemen on the conducting power of vegetables, the nature of vegetable points, the relation of vegetables to charged clouds, &c., are contained in the proceedings of the London Electrical Society, and in various journals.

In the spring of 1843 great interest was excited by the statement which then became current, that a discovery had been made of a means of collecting the natural electricity of the atmosphere so as to increase vegetation in a most extraordinary manner. The statement on which this account was founded originated with Dr. Forster, of Findrassie, Elgin; who, having stretched certain wires in particular directions over a crop of barley, had observed a most luxuriant vegetation produced. About the same time accounts of some American experiments were circulated, from which it appeared that equally extraordinary effects on vegetation had been produced by the influence of feeble currents of voltaic electricity.

The account given by Mr. Gordon at the Tring Agricultural Association, in 1844, of Dr. Forster's experiments at Findrassie, was briefly as follows. A portion of a field of Chevalier barley, measuring twenty-four poles, was enclosed by a parallelogram of iron wire, sunk about three inches below the surface of the soil, and so arranged that its longest dimensions were north and south; in the middle of the two shorter sides, and therefore, due north and south, poles were fixed about eleven feet high; and over these was stretched another iron wire, well connected at either extremity with the shorter sides of the buried parallelogram of wire. Besides this, two smaller plots of ground in the same field, of eight poles each, were enclosed in the same manner, only the poles were much lower. In all these squares a very marked effect was observed: the young barley was remarkably dark in colour, and grew very rapidly. In the two smaller squares this effect gradually went off, but in the larger parallelogram with the higher poles, it continued to harvest-time; the enclosed barley being considerably finer, larger, and more healthy than the rest

of the field. It was, however, noticed to turn yellow rather later than the unenclosed part.

At a later period, when the barley had been threshed and weighed, the results of the experiment were announced. It was stated that the return had been at the rate of 104 bushels or 14 quarters per acre, not including the tail corn, and 9300 lbs. of straw. But in the accounts of these results which appeared in the newspapers, no comparative statement accompanied them of the crop yielded by the other parts of the field, which was merely described as being "a lawn recently laid down with Chevalier barley and grass."* Very great interest was excited everywhere by the account of these experiments, and they were repeated in all parts of the country in the following spring. Amongst other places, a series of experiments on this subject were made at the gardens of the Horticultural Society, of which a short account will immediately be given.

Amongst the earliest experiments on the influence of galvanic electricity on growing plants, appear to have been some described in July, 1844, by Mr. W. Ross, to the Farmers' Club at New York; at least these experiments were quoted in all farming journals and newspapers, and certainly were the cause of a great number of similar experiments being tried. Mr. Ross stated that, having planted some seed-potatoes in drills, he buried at the one end of these rows a copper plate, five feet long and fourteen inches deep, and connected it by a wire with a zinc plate of the same dimensions, also buried, but two hundred feet distant, being at the other end of the rows. On the 2nd of July some of these potatoes were dug up and found to be two and a half inches in diameter, while the rows on either side, which were not under the influence of the galvanic current, had not formed tubers of more than half an inch in diameter. This statement, like that of Dr. Forster, excited very great interest.

The ordinary sources of electricity are the friction or contact of dissimilar substances, chemical action, heat, and magnetism; and almost all the cases in which electricity is evolved may be arranged under one or other of these four heads. According to the mode in which it is evolved, the properties of electricity vary considerably, and accordingly it is usual to divide electric effects into two great classes, those which are produced by electricity of quantity, or voltaic electricity, and those produced by electricity of intensity, frictional or machine electricity; the properties and effects of these two great divisions are different in many very important points: it will therefore be right in considering their

* Agricultural Gazette, 1844, 741; 1845, 249.

influence upon plants, to separate the effects of the one from those produced by the other, though the two are most intimately connected together.

That electricity of tension should produce some effect on growing plants might certainly be expected from its known powers; and that it does in nature exert considerable direct influence upon the growth of plants is more than probable, though certainly not to the extent which some of the older electricians imagined. There are three ways in which electricity may be supposed to act upon plants—chemically, mechanically, and as a stimulant. Atmospheric electricity, it is well known, occasions the formation of nitric acid in the atmosphere, and this effect may probably be produced by some of the more quiet forms of electric discharge, as well as in thunder-storms; it may, and in fact no doubt does, assist in the formation of certain matters essential to the growth of plants, as well as to the decomposition of various compounds in their structure. If we adopt the view which many considerations have of late years strengthened and confirmed, that chemical action is but a modification of electricity, we may say, with strong plausibility, that the growth of plants, the decomposition of carbonic acid, water, and ammonia, &c., is a mere electrical effect; but in this case the negative and positive electricity evolved by these molecular changes is not set free in an independent or current form, but neutralise each other at the moment of evolution. The moving power of these changes is generally stated to be light, or “vital energy” under the influence of light; but the true nature of the relation which exists between chemical action, light, and electricity, is far from being yet understood.

The mechanical effects of atmospheric electricity on vegetation, such as augmenting exosmose, endosmose, and evaporation, &c., can hardly be very important, though, being constantly in operation, they may in the end have considerable influence on plants.

The stimulating effects of electricity, or rather the question whether electricity does possess any stimulating effects on plants, is a serious and important subject of inquiry, and one well deserving investigation. There appears little evidence to prove that plants possess any nervous irritability analogous to that of animals—a fact for which we might be prepared by the absence of any organs corresponding to nerves; yet there are many curious facts connected with the irritability of certain parts of plants, the influence of external agents on the circulation of the fluids of plants as evinced by the movement of solid particles in the cells, which very closely resemble electric effects, and can better be explained on electrical grounds, than on any other. What connexion may exist between

electricity, and the so-called vital energy of plants, remains still involved in obscurity, and, in fact, constitutes one of the most curious problems of vegetable physiology. These observations of course apply only to growing plants; the influence of free electricity on the germination of seeds is quite a different consideration: in electrifying seeds sown in earth, as in electrifying those in Leyden jars, or wrapped up in tin foil previous to sowing them, we really do not at all place them under the influence of electricity, because we only electrify the outside surface of the vessels in which they are placed, the surface of the soil, the coats of the Leyden jar, and the outside of the tin foil in which they are enclosed.

Although it is the custom, in ordinary language, to speak of negative and positive electricity, as though they were two distinct kinds of power, yet it must always be remembered that the terms are merely relative, and that whenever we have any substance charged with the one, other substances in the neighbourhood either are, or tend to become, in the opposite state; which conditions remain, until either by conduction or by other means the mutual neutralization of the two is effected. Thus, under ordinary circumstances, the surface of the earth and plants growing in it are negative, whilst the air is positive; and this condition is perpetually being destroyed by the slow but continuous discharge which is always taking place. Hence therefore the effects of frictional electricity are divided into those of statical, and dynamical electricity, or those which are due to the mere proximity of masses of matter in opposite electric states, and those which are due to the act of neutralization of those opposite states. In the case of galvanic electricity, or electricity of quantity, it is quite different; the effects produced by it are all those of dynamic electricity, and, as the source which produces it continues, so the effects themselves are continuous: galvanic electricity, or as it is sometimes termed current electricity, is always produced in a circuit, which indeed is a necessary condition to its being evolved, and to its producing those effects which are peculiar to it. Current electricity may be excited in a circle of conducting matter by chemical action occurring at one part of the circle, by inequality of temperature, or by magnetic induction. Of the first case we have an illustration in the ordinary voltaic battery, where electricity is evolved by the action of zinc upon water; of the second case we have an example in thermo-electric piles, where electricity is developed by the unequal temperature of the joints of a compound series of two different metals; and of the third we have a beautiful illustration in the magneto-electric machines, where a rapid succession of electric currents is produced by the

successive formation and destruction of a magnet by induction, which in turn induces in a wire bound round it corresponding electric currents.

The effects of current galvanic electricity on vegetation may be supposed nearly identical with those of frictional electricity, as the chief effects of the latter have been described as being produced by it in its dynamical state; and hence the consideration of this form of electric power resolves itself rather into a consideration of its sources as regards vegetation. The observations already made, with respect to the close connexion between chemical action and electricity, apply to all forms of current electricity, whether of frictional or galvanic origin; such currents are constantly being formed both by the gradual neutralization of atmospheric electricity, and also by the chemical changes continually going on in the soil and in the organs of growing plants.

We may now proceed to inquire in how far the plans proposed in England and America for the application of atmospheric and galvanic electricity are calculated to assist vegetation; considering, firstly, in how far they are adapted to the object in view, and, secondly, whether the effect desired, if obtained, is likely to promote the growth of plants? From some of the statements which arose out of Dr. Forster's description of his original experiments, it was evident that a very indefinite conception was entertained of the mode in which such an apparatus could act, some seeming to imagine that the wire, in consequence of its relation to the axis of magnetic power in the earth, would be in the same position as a wire in the vicinity of the pole of a magnet, and that consequently a current would be established throughout the entire length of the wire; whilst others viewed it merely as a means of discharging or collecting the free electricity of the atmosphere. When a magnet is moved in a certain position to a circle of wire, an electric current is generated in the wire, or, if the magnet be kept stationary whilst the wire is moved, the same effect is produced; and by extending this principle, and moving a portion of a wire circle so as to cut the lines of magnetic influence of the earth, an electric current may be obtained; but of course in this case, as with an artificial magnet, either the wire or the magnet must be moved; if both are stationary, or, what is the same thing, if both are moved at the same rate and in the same direction, no current can be produced: hence we see at once that, upon theoretical reasons, we cannot expect any current to be generated by induction in a wire suspended above the surface of the earth, with the intention of cutting its line of magnetic force; and the truth of this is moreover borne out by experimental evidence, as no current whatever

is found to be generated in a wire of any length suspended in any direction. The only way then in which we can regard such a wire as acting, is in equalizing the electricity of the earth and atmosphere, either assisting in neutralizing the opposite electric states of the earth and air, which, when highly dissimilar, may possibly be hurtful to vegetation, or as discharging electric clouds and fogs, and thus bringing down moisture from the air. If the former be our object, it may be certainly more conveniently attained by other means; whilst, for the latter object, much more elevated wires would be requisite except in very barren places, or countries where there are no trees, which of course would interfere with the action of wires near the earth.

The arrangement proposed, for the application of galvanic currents to growing plants, is one in which, provided it acts, a feeble current will constantly pass across the roots at right angles to their axis of growth: such an arrangement therefore could hardly assist them in a chemical point of view, but could only be expected to aid them, and that in a very imperfect manner, as a stimulant; the plant next the one plate might possibly be assisted in its growth by the gradual decomposition of saline matters in the soil, and consequent evolution of substances either directly or indirectly favourable to vegetation, but the plant at the other end would probably be proportionably injured, whilst the intermediate ones would be neither benefited nor injured, unless the electricity in passing across the roots could stimulate or augment their energy. In the arrangement first proposed, where plates were buried at either end of a row of plants, the electricity would tend to pass from the zinc to the copper through the best conducting part of the soil, and this would naturally be the moistest: the current therefore would pass at a considerable distance below the surface of the ground, and below the roots of young plants altogether.

In the experiments on these subjects made in the Horticultural Society's Gardens, it was not thought necessary to repeat exactly the arrangement described by Dr. Forster; the more so, as numerous repetitions of his experiments were being made in various parts of the country; amongst others, one by Mr. Jessop on his Grace the Duke of Devonshire's estate, within half a mile of the Gardens.

In this experiment Dr. Forster's original statement was followed as closely as possible. The field was eleven acres, sown with barley, and the portion enclosed by the parallelogram of wire was half an acre. The wire was of iron, and the poles were rather more than fourteen feet in height. No perceptible difference was at any time observed, either whilst growing or at harvest time, between the enclosed part and the rest of the field.

In order to ascertain the effect which would be produced by effecting a complete metallic communication between the earth and the atmosphere, a small plot of ground was prepared for barley. The soil having been well levelled and raked smooth, stout copper wires were sunk four inches below the surface parallel to each other, and twelve inches apart, over the whole of the ground, and at either end a bright clean wire was placed across all the others, the ends of which were firmly attached to the two end cross wires, by being twisted round them : towards either end of the square of ground a pole 33 feet high was fixed, bearing at its upper part a large star of fine-pointed copper rods, each 30 inches long, well connected with the wires buried in the soil by stout wires attached to the poles. When thus prepared, another similar piece of ground was treated in the same manner, no wires or poles being employed, and both then sown with barley, which was dibbled in, in rows six inches apart ; in the one plot the plants being left free and untouched, whilst in the other every row of grains was close to a copper wire connected with a system of ten bright points raised 33 feet above the surface of the ground—an arrangement which would certainly rapidly neutralize any difference between the electrical state of the earth and atmosphere. The barley all came up at the same time ; it was very closely watched during its growth ; the crop was quite alike, and in both plots was small, and at no time was any difference whatever observed in the appearance of the two little fields.

A small field of potatoes was divided into four beds, by a path of six feet wide between each, four rows being in each bed ; two of these were employed in experiments with wires, one was left untouched for comparison, and the fourth was devoted to an experiment with buried plates. Over one bed a number of thick copper wires, 12 feet long, pointed at both ends, were suspended by means of well-tarred lines of packthread, at such a distance above the surface of the ground that the lower points of the wires were about a foot above the soil, the upper points being a foot above the string to which they were attached. A row of wires was suspended above each row of potatoes, which were three feet apart, and the wires in each row were about four feet from each other. This arrangement was intended to assist in the neutralization of the opposite electricity of the soil and air, the plants being part of the discharging system. In the second bed, wires well connected together were placed on either side of the sets, buried about six inches below the surface of the soil, and connected with a third wire, stretched a foot above it, just over the line of sets, and bearing a series of pointed wires, a foot long, attached throughout its length, at distances of twelve inches apart, which therefore hung downwards towards the young plants. During

the growth of these beds of potatoes no difference whatever was perceptible at any period on the most careful and rigid comparison. Towards the ripening of the tubers, those in all the beds were attacked by the prevailing rot; it took them comparatively late, and but slightly; this effect, however, was not peculiar to those which were the subject of electric experiments, as there was no difference between them and the standard bed. The tubers were taken up in the middle of October, when the following was the produce of the respective rows. Each row was fifty feet long.

	Standard.	Long pendent wires.	Buried and short wires.
Row 1	89 lbs.	104 lbs.	92 lbs.
2	62	73	80
3	87	88	65
4	101	93	96
Mean . . .	82	89	81

The difference between the three beds was very small therefore, and quite within the ordinary limits of accidental difference, because, though it is true that the mean of the second bed is rather higher than either of the others, yet we see that even in that bed the produce of the four rows varies as much as 31 lbs., whilst in the third bed it varies 31 lbs., and in the standard 39 lbs. The result of this experiment therefore, like that with the barley, appears decidedly opposed to the idea of atmospheric electricity exerting any strong influence on the growth of plants under ordinary circumstances.

In order to ascertain the effects of feeble galvanic currents on the germination of seeds and subsequent growth of young plants, the following experiments were made: a slip of zinc plate, 2 inches by 6, was connected by a wire with a plate of copper of the same size, and placed in the earth, the edges just appearing above its surface, at a distance of eight inches; eighteen grains of barley and the same number of wheat were then sown in two straight lines between the plates, and a similar series were also sown close by, without any plates; all other conditions were as like as possible: the result of this experiment was—

	5th Day.		6th Day.		7th Day.		8th Day.	
	Plates.	Without.	Plates.	Without.	Plates.	Without.	Plates.	Without.
Wheat .	2	0	8	1	12	7	18	18
Barley .	5	3	18	15	18	18	18	18

In another similar experiment with twelve seeds of wheat alone, in which the plates were buried below the surface, and placed horizontally edge to edge, with little more than a quarter of an inch between their edges; on the sixth day ten had come up between the plates, and but six without them. These experiments, however, though they certainly seemed to confirm the

popular statement, were unsatisfactory, as being on too small a scale, and consequently very liable to mislead; it was therefore thought right to commence an extensive series of similar experiments, on a considerable variety of plants; for this purpose 140 small beds were prepared, and in every alternate one there were sunk a couple of metallic plates, one zinc and the other copper, 4 inches deep and 5 broad, connected together by a piece of stout copper wire, and so placed that about half an inch of each plate was visible above the surface of the ground, at a distance of six inches apart. The beds were arranged in rows, the alternate ones of each row having plates, whilst the intermediate ones were left free as standards of comparison; thus the first bed of the first row had plates, the first of the second row had none, and was kept as a standard; the second bed of the first row was kept as a standard, whilst the second of the second row had plates, and this alternation was kept up throughout the whole series, in order to guard against any effects which might possibly be subsequently attributed to the peculiar position of any one row, as compared with the others. Immediately after putting in the plates, the whole sum of little beds was sown with seventy different sorts of seeds; as nearly as possible the same number of seeds being sown in each couple of beds, and the same covering of mould being given in each case; all other circumstances were alike. The experiment was watched from day to day, and the number of plants which came up, noted down. The following table shows the result of these experiments. The seed was sown at the latter end of May.

	First week.		Second week.		Remarks.
	With plates.	Standard ard.	With plates.	Standard ard.	
Flanders spinach	2	9	10	21	Against.
White Alphange cos lettuce	11	8	18	18	No difference.
Malta lettuce	15	21	15	21	Ditto.
Green Paris cos lettuce	20	27	28	27	Quite equal.
White Paris cos lettuce	49	117	50	120	Against.
Green-topped white carrot	..	..	20	25	Rather against.
Long scarlet radish	9	8	18	15	Rather in favour.
Early rose-coloured radish	8	8	13	15	Quite equal.
Short-topped scarlet radish	12	8	17	10	In favour.
Long rose-coloured radish	23	9	39	20	Ditto.
White Silesian sugar beet	..	..	1	4	No difference.
Red-leaf beet	..	..	5	4	Ditto.
Portugal cabbage	17	23	52	55	Equal.
Yellow savoy	4	3	11	9	Ditto.
Pomeranian cabbage	8	8	22	18	Ditto.
Large green savoy	28	8	41	20	In favour.
Chappel's broccoli	2	3	21	24	Rather in favour.
Knight's protecting broccoli	1	2	11	9	No difference.
Yellow Vertus onion	..	..	..	1	Quite equal.
Spanish onion	..	..	2	1	Rather against.

	First week.		Second week.		Remarks.
	With plates.	Stand. ard.	With plates.	Stand. ard.	
Auvergne pea	3	3	4	8	Rather against
Knight's tall marrow pea	..	..	2	2	No difference.
Early dwarf Dutch kidney bean	..	..	3	3	In favour.
Belgian black kidney bean	..	..	8	10	Against.
Sinapis pekinensis	53	57	61	71	In favour.
Yellow Malta turnip	94	58	94	79	Rather in favour.
Long white early turnip	46	39	48	40	No difference.
Normandy curled endive	16	14	25	26	Quite equal.
Green purslane	5	11	32	62	Ditto.
Golden purslane	40	23	81	38	In favour.
Scorzonera	..	..	5	12	Against.
Salsify	..	..	4	4	No difference.
Cauliflower	6	14	9	34	Against.
Red Castelnaudary beet	..	..	9	9	No difference.
Windsor bean	..	..	4	3	Against.
White-flowered vetch	..	..	4	8	Ditto.
Rye	12	6	12	8	In favour.
Talavera spring wheat	7	3	13	15	Against.
Chevalier barley	3	5	14	16	Equal.
Oats	3	0	8	7	Ditto.
Wheeler's imperial cabbage	24	24	41	37	Ditto.
Round spinach	..	..	7	3	In favour.
Campanula Medium	..	..	2	17	No difference.
Lupinus nanus	9	2	15	11	In favour.
Dianthus splendens	..	..	5	2	No difference.
Phacelia tripinnatifida	..	..	8	5	Ditto.
Gilia achilleafolia	12	..	22	3	In favour.
Papaver amœnum	..	..	5	3	No difference.
Gilia tricolor	27	40	60	70	Against.
Calandrinia speciosa	..	..	10	1	No difference.
Eutoca viscosa	13	10	25	25	Quite equal.
Glaucium rubrum	..	..	14	2	No difference.
Leucaria senecioides	3	6	8	27	Against.
Sweet William	60	16	90	26	In favour.
Lupinus pubescens	..	..	2	3	No difference.
Leucanthemum paniculatum	..	..	3	6	Ditto.
Godetia viscosa	10	8	18	15	In favour.
Collinsia tricolor	..	..	42	25	Against.
Godetia bifrons	22	30	22	50	Ditto.
Clarkia elegans	..	..	38	7	In favour.
Linaria Perrozzii	..	..	7	1	No difference.
Schizanthus pinnatus	..	30	10	53	Against.
Malva mauritiana	..	..	6	4	Ditto.
Godetia albicans	10	20	12	19	Equal.
Crepis Drummondi	37	6	48	15	In favour.
Papaver amœnum	4	4	4	10	No difference.
Collomia coccinea	90	61	101	110	Ditto.
Callichroa platyglossa	..	..	8	10	Equal.
Gilia tricolor splendens	..	..	48	50	No difference.
Clarkia pulchella	..	..	11	28	Against.
Total seeds up	818	752	1579	1522	

The remarks in the last column show the appearance of the two patches as favouring or opposed to the view of electric influence, that is to say, the comparative vigour of the plants with the plates and those without. It will be observed in the first place, that the number of seeds which came up was, generally speaking, very similar—in 6 cases the numbers were equal, in 32 the standard squares were most forward, and in the remaining 32 those with the plates were most numerous. Again, on comparing the appearance of the plants, in 18 cases the plates seemed to have done harm, in 17 cases good, and in 49 cases to have produced no effect at all. The plants were allowed to grow up, flower, and form seed, but no marked effects or differences greater than those usually observed in sowing different portions of seed, even in the same ground, were at any time remarked.

Pairs of zinc and copper plates were also buried at either end of some rows of potatoes; the fourth bed of the experiment already described was employed for this purpose; the plates were 24 inches by 12, and were connected together by stout copper wires, rather more than 50 feet long, which were suspended about three feet above the surface of the soil. Only three of the four rows in this bed were thus arranged; the fourth had wooden uprights at the ends, and a wire stretched along its whole length like the three others, but no zinc and copper plates were buried at the ends. The plants were frequently and carefully compared together, but at no time could any marked difference whatever be observed between the four rows, or between them and the plants of the standard bed. When the plants were fully grown, it appeared that these four rows were a little taller than the standard; but the difference, if real, was very trifling indeed—certainly not more than what might be expected from the natural inequalities of the soil. The yield of these rows was—

	Standard.	Buried plates.	Wire only.
Row 1	89 lbs.	96 lbs.	..
2	62 lbs.	82 lbs.	..
3	87 lbs.	67 lbs.	..
4	101 lbs.	..	108 lbs.
Mean . . .	82 lbs.	81½ lbs.	

The conclusion to be drawn from these experiments is, upon the whole, opposed to the supposition of the great influence of electricity on vegetation; or at least, that the electrical effects produced by such apparatus as those described have very little, if any, influence on the growth of plants; and from these and other experiments made during the past year, I am led to believe that a great part, if not the whole, of the effects recently described as electrical, are accidental or due to adventitious causes.

XII.—*On the Ventilation of early Forcing-houses.*

By Mr. Thomas Moore.

(Communicated Oct. 20, 1845.)

There is scarcely a more important matter connected with gardening than the ventilation of forcing-houses during the winter and early spring months; and perhaps there is hardly any operation upon which less definite notions seem to a very great extent to be entertained. There can be no doubt that the admission of cold air in any considerable quantity during the period referred to, is more likely to cause injury than advantage to the plants; nevertheless we generally find the most unguarded recommendations given in reference to this very operation; “Admit air freely”—“Give air on all favourable opportunities,” and similar instructions are commonly to be met with. These directions are, to a certain extent, correct; but a consideration of the purpose for which air is admitted will be enough to show that they are far too unconditional and indefinite, as change of the internal air of a forcing-house or of any other plant structure is effected for one of these purposes,—either to allow superfluous moisture to pass away, to carry off gaseous impurities, or to regulate the temperature.

The first of these is not a valid reason for the admission of air under the circumstances referred to, because whatever excess of moisture there may be, in the heated atmosphere maintained in these structures, *must have been artificially supplied*; and the proper remedy therefore is clearly not an admission of fresh air less charged with moisture, but a more judicious course in *regulating the supply of moisture*.* It is to effect this purpose, chiefly, that green-houses and all plant structures, where a temperate climate only is maintained, require to be ventilated in winter and the early part of spring.

The second reason given for the admission of air ought not to afford an excuse for indulging in the practice to any extent during the period referred to; for, in the first place, under proper management, no impure gases should be generated; and, secondly, if this were the case to a small extent, the expansive nature of the atmosphere and the nature of such structures would together secure a change sufficient to prevent any damage from this cause. The Wardian case gives sufficient evidence that plants will grow even in an atmosphere much closer than that

* “One of the causes of success in the Dutch method of winter-forcing is, undoubtedly, the avoiding the necessity of winter ventilation by intercepting the excessive vapour that rises from the soil, and which would otherwise mix with the air.”—*Theory of Horticulture*.

of any forcing-house, provided it is kept pure and properly balanced with regard to moisture. When smoke flues were used as the medium of distributing artificial heat, the admission of air for this purpose might have been required on account of the sulphurous acid gas transmitted through the bricks ; but the present almost universal use of hot water for this purpose, by doing away with the source from whence the air became impregnated with impurities, has also removed the necessity of admitting air for the purpose of purification.

If this be correct, then the regulation of temperature may be considered as the only legitimate reason for opening forcing-houses during the period under consideration. An excess of heat is injurious to all plants, and to forced plants, growing at an unnatural period of the year, even more than to those whose growth is affected during their ordinary and natural period of action. But it is necessary to distinguish between natural and artificial heat—between the heat of the sun and that of a hot-water apparatus. In the former case, when the temperature of the confined atmosphere has been raised to what is judged to be the maximum point which may be allowed without injury to the plants, yet the heat being inevitable, and its source uncontrollable, the act of ventilation becomes justifiable ; but, in the latter case, when the excess of heat is altogether artificial, while ventilation is equally necessary as in the former case to correct the evil, it is by no means so justifiable, inasmuch as a little management of the source whence the supply was derived would have altogether prevented its necessity ; and hence it is (the action of cold air on the tender tissues of forced vegetables being excessively injurious) that the proper course, so far as concerns the health of the plants, is to avoid the application of so much heat as renders the admission of air for lowering the temperature an act of necessity. There does not appear to be good reason for the admission of cold air simply for the purpose of lowering a temperature that has been artificially raised too high : how much more consistent as well as economical to apply *only as much* heat as is necessary ! besides, such a course would preserve the plants from risk of injury by exposure to cold.

But there is another evil attending this practice. Cold air drains the moisture, first from the warmed atmosphere and then from the plants themselves ; so that the constant admission of cold air and the maintenance of that degree of humidity which is judged necessary for excitement and support of vegetation (the growing shoots of a vine, for example) are circumstances quite incompatible with each other. Air, at a given temperature, can hold in suspension but a certain degree of moisture, and as it becomes heated its capacity for moisture is increased ; thus, when

the cold air which has been admitted becomes warmed by contact with the heated air of a plant-house, its capacity for moisture is increased, and it will draw the moisture from the surrounding volume, until the whole is brought to a state of equality: if this goes on long enough the moisture of the atmosphere becomes dissipated, and that contained in the tissues of the plants becomes acted on in a similar way.

A considerably higher temperature may be indulged in, when accompanied by a corresponding degree of moisture, than would be safe were less moisture employed; so that the application of moisture in the form of impalpable vapour may often be the means of avoiding the necessity of admitting air when the temperature becomes suddenly raised by sun heat.

Although the admission of large volumes of cold air is injurious to forced plants in the winter and early spring, yet as some degree of ventilation is required, it is of importance that what air is admitted may be so far under control as not to affect injuriously the tender plants, for whose benefit it is intended. One means of effecting this is to have the cold air warmed before it comes in contact with the plants, but this must be by a process which will not deprive it of its moisture, nor render it in any way impure.

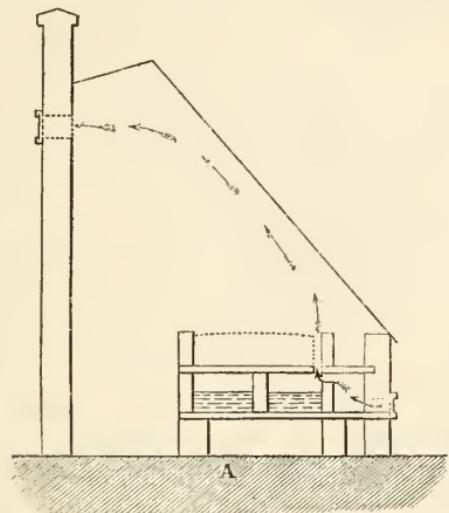
Motion of the internal volume is another condition of importance to the plants, and though distinct from ventilation, is nevertheless a very valuable auxiliary and substitute for it when the latter cannot be ventured on. This motion may be secured in a variety of ways by modification, and the principle of the plan adopted by the late Mr. Penn of Lewisham for warming buildings, and to which the Polmaise plan of heating is very nearly allied, differing more in detail than in principle.

In a little book * on the culture of the Cucumber, published in 1844, I recommended the warming of the external air before admitting it to the plants, by a plan which will be explained by the annexed diagram (A).

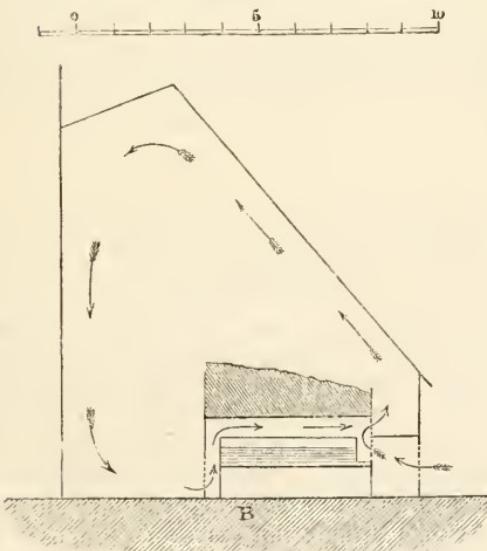
The main point which this plan was intended to secure was this; that the cold air should pass directly over the surface of the heated water in a tank provided for supplying bottom heat to the cucumber plants; and by passing over this surface, it was supposed that it would not only be warmed, but so far charged with moisture as not to abstract any from the succulent foliage and stems of the plants, but rather to furnish them with a source whence they themselves might draw part of their supply. This plan was entirely unconnected with any scheme for securing

* Theory and Practice applied to the cultivation of the Cucumber in the winter season.

motion without admitting the external air; but it is obvious that both might be combined, as in the following diagram (B), which also represents an improvement upon the original plan.



A



B

In this arrangement it will be seen that the cold external air is supposed to pass through a heated chamber separate from the tank, but admitting of communication for the purpose of supplying moisture, if necessary. Thus the external air may be warmed

either with or without being moistened before it reaches the plants inside the houses; or the moisture may be directly admitted from the tanks by other means, in the exact quantity required at any particular stage of growth. The advantage gained by this plan is a greater command over the moisture of the atmosphere; though in a forcing-house such a power would seldom be required to be put into practice.

Another mode combining internal motion with ventilation, and by which the cold air is warmed before it reaches the plants, has been practised with very marked success during the season of 1845, in a viney at Park Hill, Streatham, under the direction of Mr. Dodemeade, gardener to William Leaf, Esq., F.H.S. This plan consists in passing a zinc pipe, thickly perforated with small holes, from end to end of the viney, and exactly beneath the range of hot-water pipes which heat the structure. In the outer wall, communicating with this perforated pipe by means of a kind of broad funnel, a register valve is fixed by which the admission of air can be regulated with the utmost nicety, or the supply be shut off altogether: this valve is fixed a little below the level of the perforated pipe. The action of this contrivance was evident enough from the motion communicated to the foliage of the vines; and its effects were apparent in the unusually healthy and vigorous appearance they bore, until their period of ripening. In this case, sufficient moisture was kept up by syringing the walls and pipes, wetting the pathway, and by the use of evaporating troughs placed on the metal pipes, and kept constantly filled with water.

XIII.—*A Note upon the Wild State of Maize, or Indian Corn.* By the Vice-Secretary.

WHEN Maize was first noticed by writers on Rural affairs it had already acquired the name of Turkie Corn, Corn of Asia, Spanish Corn; and hence it was thought to have had an Asiatic origin. Parkinson, who wrote in 1640, even fancied that it might be the Bactrian corn mentioned by Pliny.* But Gerarde gave a more correct history of its introduction:—"These kinds of Grain," he says, "were first brought into Spain, and then into other provinces of Europe; not (as some suppose) out of Asia Minor, which is the Turk's dominions, but out of America and the Islands adjoining, as out of Florida and Virginia, or Noreni-

* "Tradunt in Bactris grana tantæ magnitudinis fieri ut singula spicas nostras æquat."—(*Hist. Nat.*, lib. xviii., c. 7).

berga, where they used to sow or set it to make bread of it." He adds, "Wee have as yet no certain proof or experience concerning the vertues of this kinde of corne, although the barbarous Indians, which know no better, are constrained to make a vertue of necessitie and think it a good food."—(*Gerarde's Herball*, by Johnson, p. 83, Edition 1636.)

Hernandez, in 1651, produced conclusive evidence of the American origin of this kind of corn; for in his account of the Natural History of Mexico he gives a figure of it, and states that its Mexican name is *Tlaolli*; and that of a beverage made from it, *Atolli*.*

Hernandez, however, gives no account of the wild state of the plant, nor does any other author that I have been able to meet with; and therefore a communication from Mr. M. Floy, of New York, acquires considerable interest. In a letter, addressed to the Secretary, he makes the following statement:—

"Last year I received from the Rocky Mountains a few grains of Native Indian Corn, which I consider to be the original corn. Its appearance is remarkably different from the cultivated varieties, each grain being covered with a husky glume. I planted it last spring, where no other corn could come in contact with it. I raised only two or three ears, which were of the same nature as those placed on the top of the ear of the corn received. I observed a grain or two which was but little covered with husk, the produce of which is almost like our common corn, showing that from its wild state two or three years of cultivation would bring it into its present form."

This supposed wild form of the Maize is so interesting as to deserve an exact account of it. Three ears were received, of which the smallest was eight inches, and the largest a foot in length. They resembled Indian corn when very young, while the chaff or husks of the flowers still cover over the grains: but the grains were plump and ripe, and there was no sign of immaturity. In one of them a small number of grains near the point of the ear were peeping through the chaff or husks, or perhaps it would be more correct to say, that near the point of one of the ears the chaff had already begun to diminish in size and to shrink back from the grains.

The accompanying figures will show more clearly the difference between the wild and cultivated corn. Fig. 1 is the former, in the upper part showing the appearance of the ear before it is cut open, and the lower, the grains enveloped in large leafy chaffs.

* M. Kunth (*Enumeratio plantarum*, i. 19) states that Maize is wild in Paraguay, upon the authority of M. Auguste de St. Hilaire; but I do not find mention made in the works of that author of his having found Maize in a wild state.

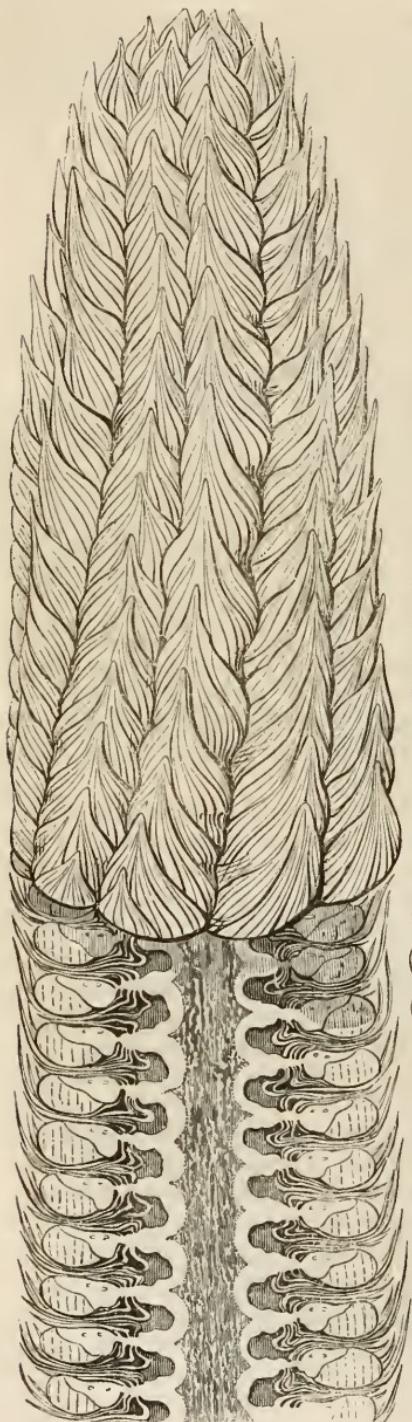


Fig. 1.

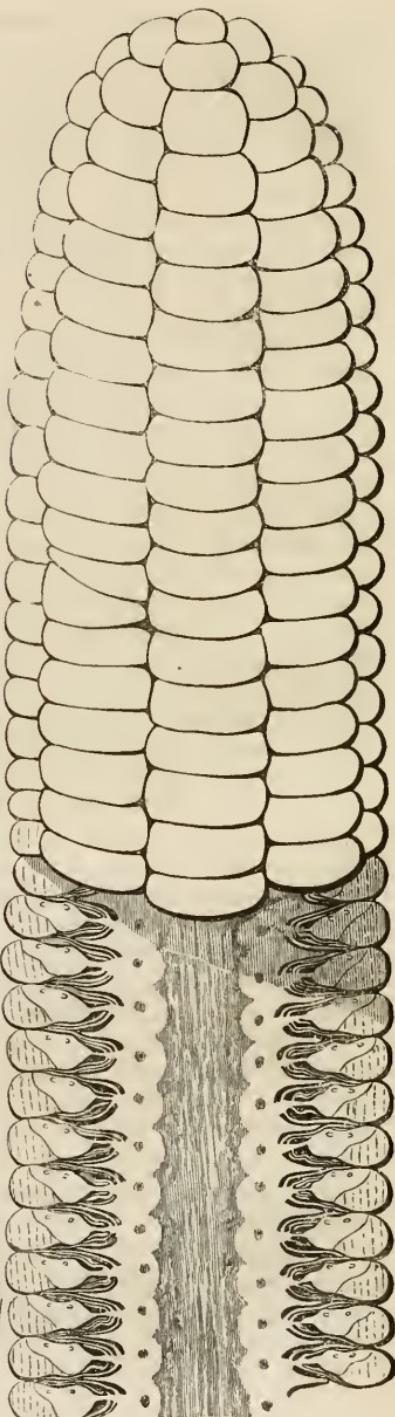


Fig. 2.

Fig. 2 represents the corresponding appearance of an ear of the large white variety commonly cultivated in the United States : its grains are not at all larger than those of the wild corn, but its chaffs are reduced to little membranous half-transparent scales, which are entirely concealed by the protruding grains. It is also curious to remark, that cultivation has at the same time produced another effect, the centre of the ear having become large and firm while the chaff has diminished : as if the deterioration of the latter had caused the enlargement of the former ; a somewhat important fact, when it is considered that the centre of the ear of Indian corn is itself a receptacle of nutritious matter.

Upon measuring off their parts, the following appear to be their respective proportions :—

	Width of Centre.	Length of Grain.	Length of Chaffs.
Wild Corn	. 4 lines	. 4 lines	. 11 lines
Cultivated Corn	. 9 lines	. 4 lines	. 2 lines

To those who are acquainted with the changes which our cultivated esculents have in some cases also undergone, this new fact will probably show that it is by no means to be expected that such plants as corn and fruit-trees should be recognizable in a wild state ; and that it is quite possible that the wild type of some of our domestic fruits may lurk beneath disguises hitherto impenetrable.

Indian corn adds, moreover, another example to that of the Carrot, which was completely domesticated by M. Vilmorin in three generations (See '*Horticultural Transactions*,' new series, vol. ii., p. 348), showing that in some plants the progress of improvement under cultivation is so rapid that they begin to change their form perceptibly from the moment when they are first brought under the dominion of man.

XIV.—*Some Account of the Jefferson Plum.* By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen-Garden Department, in the Society's Garden. (*With a Coloured Plate.*)

THIS is an American variety of the highest excellence. It was presented to the Society, in 1841, by Mr. James Barnet, who obtained it for his nursery at Edinburgh from Mr. Wilson, nurseryman, New York. It fruited for the first time in the garden of the Society last season, an unfavourable one for plums and fruits generally. Nevertheless, the variety in question was found to possess so much merit as to render a drawing of it de-

sirable from a specimen, produced on a standard, to which the rest on the tree were very similar.

It appears from Mr. Downing's 'Fruits and Fruit-Trees of America,' recently published, that the Jefferson Plum was raised by the late Judge Buel, and that the original tree was growing in his garden near Albany. The judicious author of the above-mentioned work says, "If we were asked which we think the most desirable and beautiful of all dessert plums, we should undoubtedly give the name of this variety." No one can read this statement without recollecting the well-known excellence of the Green Gage, and questioning whether, in point of flavour, it can possibly be equalled by the variety under consideration. To say that the Green Gage under the most favourable circumstances for acquiring perfection would be surpassed, might prove an exaggeration. That remains to be determined. In the mean time it can be stated that in the past unfavourable season, in which only there has been an opportunity for comparison, the Jefferson was found decidedly superior to the Green Gage.

Fruit large, roundish-oval; stalk about an inch in length. Skin dark yellow, remarkably speckled with purple and brownish red. Flesh deep orange, slightly adhering to the stone, juicy, exceedingly rich and sugary. Stone middle sized, elliptic. Ripe in the third week of September; but in ordinary seasons it will probably attain perfection about a fortnight earlier. The tree appears to be a great bearer as a standard. Shoots smooth, or but partially and very slightly downy, of an upright growth. Leaves middle sized, elliptical, glabrous above, serrated or acutely crenated.

In rich soil, or against a wall, where it well deserves to be placed, this variety would doubtless attain a much larger size than is here represented. It will afford a later supply than the Green Gage; for it has the property of hanging for a considerable time on the tree after being ripe. In strongly recommending it for extensive cultivation, the circumstance of its having proved so good in a cold wet season like the past is not to be overlooked; it leads to the inference that the tree may be advantageously cultivated in situations where many hitherto known varieties cannot acquire any tolerable degree of flavour. What fruit can be worse than bad plums? The most effectual means of driving such out of cultivation is the introduction of good and productive varieties.

XV.—Outlines of a Natural History Calendar at Foo-chow-foo, the capital of the Chinese province of Fokien (Lat. 26° 4' S., Long. 119° 4' E.). By the late G. Tradescant Lay, Esq., F.C.M.I.I.S., Her Majesty's Consul at that place.

(Communicated August 6, 1845, by the Right Hon. the Earl of Aberdeen, Her Majesty's Principal Secretary of State for Foreign Affairs, to whom it was transmitted by his Excellency Sir J. S. Davis, Bart., Governor of Hong Kong.)

THE first portion of this curious Calendar, embracing four months, has already appeared in the Society's Transactions, vol. iii., *second series*, p. 237. It is to be hoped that the lamented death of Mr. Lay will not have prevented the transmission to Europe of the remainder, of which five months more will complete a twelvemonth.

Outlines of Calendar for November, 1844.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
1	72	78	30,04	..	Dry.	A.M., N.E.; noon, S.E. Do. do.	Morn cloudy. Noon cloudy, with fits of sunshine.
2	72	77	30,04	..	"	Do. do.	Cloudy with mists, which are more frequent here than in any part I have visited.
3	72	76	30,03	29,98	"	Do. do.	Morn gray, with fits of sunshine.
4	71	76	29,94	..	"	Do. do. Light airs.	Rain fell during the last night. Sky cloudy and lowering: these threats not followed by rain.
5	70	75	29,94	..	"	Do. do.	Misty. Rain in the evening.
6	64	71	29,99	..	"	Do. do.	Rainbow at sunrise. Sky variable during the day.
7	65	76	29,80	29,83	"	Do. do.	Cloudy. Clouds of the configuration which Mr. Howard calls cumulo-strati.
8	66	75	30,03	29,89	"	Do. do.	At sunrise, dark clouds bordered with red. Morning sunny. At noon a few drops of rain: change in the "feel" of the wind, i.e. colder.
9	69	71	29,86	..	"	A calm.	Sunrise misty; clouds stratified. Day very dull and foggy. A few drops of rain at 8 A.M.
10	70	78	29,84	..	"	N.E., a fresh breeze.	Day clear with a few cumuli and strato-cumuli.
11	67	67	29,84	..	"	Morn, N.E.; noon, S.E.	Sky clear with a patch of cloud here and there.
12	67	67	29,90	..	"	N.E.; noon, S.E.; light airs; night, N.E.	Clear aloft. A low mist couching over the city. Night clear, with a few stratified clouds; chilly.
13	64	70	29,95	..	"	Morn, N.E., with puffs from S.E.	Preceding night starlight. Day clear and sunny.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
14	64	70	29,96	..	Dry.	Morn, N.E., puffs from S.E. at noon.	Clear aloft. Mist over the city and skirting the hills as usual in clear weather.
15	64	75	29,95	..	"	Morn, N.E.; noon, puffs from S.E.; dayfall, N.E.	Morning, cloudless aloft, with dew on the grass.
16	75	omit	29,97	..	"	Morn, calm; noon, S.E.	Morn with stratified clouds, dew on the grass. Noon sky cloudless; evening again cloudy.
17	64	..	30,00	..	"	N.E.	Morn, sky cloudy, no dew; dry clear.
18	58	64	30,00	..	"	Do., Night calm.	Morn, pale copper-coloured clouds with swathes of vapour as if driven by the wind in the region below; mid-day clear; sunset cloudless.
19	58	64	30,03	..	"	N.E.	At sunrise not a cloud visible.
20	56	omit	30,06	..	"	N.E., nearly calm; P.M., southerly.	A few small clouds in patches.
21	56	64	30,06	..	"	N.E., nearly calm.	Morn clear and cloudless; a copious dew.
22	60	omit	30,03	..	"	N.E.; P.M., southerly.	Morn cloudless; mist over the city; a copious dew.
23	62	76	30,06	..	"	N.E.; nearly calm.	Morn, plentiful dew on the grass; a few wavy patches of empurpled cloud.
24	68	76	29,99	..	"	N.E.; evening westerly.	A cloudy mantle investing the sky; sun at rising just peeping between the patches. A slight shower.
25	68	80	29,97	..	"	Morn, N.E.; eve, S.E.	Sky clear; night moonlight.
26	68	omit	29,97	..	"	Morn, N.E., nearly calm; noon, S.E., puffs.	Clear aloft, foggy below.
27	68	72	29,97	..	"	W., nearly calm.	Fog-clouds rising from the north-east.
28	65	75	30,00	..	"	S.E.; eve, S.W.	Morn sky mantled with clouds; little dew. Dry fine; overcast at day-fall; weather pleasant to sense.
29	66	73	30,00	..	"	W.	Rain preceding night. Morn with a mantle of clouds. A light shower at noon. Chilly. Day showery.
30	71	72	30,00	29,91	"	W.; southerly puffs.	

Husbandry and Gardening.—1-10. Wheat sown in holes on the high lands from which a crop of Sweet-potatoes has been just removed.—A layer of mould finely mixed with ashes is put into each hole either before or after the wheat is sown. In one instance trenches were drawn by the hoe, the grain thrown in, and a dressing of night-soil.—Reaping the second crop of rice commences at the opening of the month. It is forthwith threshed in a

square tub, dried, and dressed in a machine like our own.—The ground, after being turned up with a plough or with a hoe, is broken by a three-pronged fork. A harrow has not yet crossed my eye.—15. Setting garlick, stacking straw, watering mustard-seedlings. Chah-tsae fit for the table.—17. Wheat springing up 4 inches long; ploughing and breaking the clods still continue.—18. Tobacco springing up.—19. The husbandman complains of drought. In dry weather wheat is steeped in water to promote germination, but neither in urine, lye, nor any drugged preparation.—23. Setting out of "Cheng-tsae," one of the cabbage family.—24. Saw a man weeding out the barley from the wheat, that the worse might not obstruct the growth of the better.—25. Barley is sown in the same way as wheat. The former is called "toy muk" or great wheat, the latter "chew muk," or little wheat. Both are much used here in the making of different sorts of vermicelli.

Fruits and Flowers in Season.—1-13. Sweet-potatoes (Fang-sew) are now in great abundance, and are sold for 4 cash per catty, *i. e.* less than a farthing per lb. They are dressed by steam in a sort of sieve set over a pot of boiling water for that purpose. They are much relished by the common people, who find them ready cooked as they pass along the street, and thus obtain a "bait" or "teén-sing" at an easy purchase.—Oranges of the loose and close peeled kinds begin to make their appearance, but not in any plenty.—The *Diospyros Kaki* is called "tey" here, the 本弟 "che" of the northern dialect; it being customary in this to exchange ch for t. This most wholesome fruit is now in season: here it is of a middling size and of a slightly aspect.—Garlick plenteous; the accompaniment of pork and fish.—14. Bamboo shoots, or "suing," in season.—15. Cabbage from Shan-tung dear: a kind resembling it cultivated here cheap.—16. Lettuce in leaf not earthed up: eaten by lactescent women to promote the secretion of milk.—19. The leaves of the *Stillingia sebifera*, or Tallow-tree ("Woo-keung" of the natives), turn red about this time, and then the tree exceeds in beauty both the Chinese Plane-tree and the Chinese Maple, which in Autumn are tinted with carmine, and which are much talked of by poets under the common name of "Fung Shoo."—28-30. Plants in flower: Golden Rod, berried *Polygonum*, purple Sow-thistle, Parsley, Michaelmas Daisy, Chaste tree, Dwarf-rose here and there, Dwarf-thistle or "keymoo-hwa," and Pih-tsae, or White cabbage. *Lycium barbarum* in fruit and flower.—Canarium in season, much relished.—San-cha, a kind of *Sorbus* from Shan-tung dipped in syrup and stuck on a rocket of straw.—Sent specimens of this from Ningpo to the Horticultural Society. [It is growing in the Garden.] Two are sold for 3 cash.

Animal Kingdom.—1-10. The most common species of *Sesia*, or glass-winged moth, still seen in pairs on plants and low shrubs.—The silky Ant is not less on the alert, running over the branches of the Guava-tree and the stems of the Sugar-cane in quest of any sweet or gummy juice that may ooze from the bark.—The note of the Blackbird, "Oshe-put" of Cauton, and the "Woo-hik" of this place, is no longer heard at peep of day.—The voice of the Red-winged pie still awakes the silence of the grove.—A fly that moves its wings alternately in slow and laborious action is seen on the leaves of the Canarium.—15. Cockroach of a small size and spotted with ash and brown, common in the nests of the *Clubiona*.—18. Saw a pair of herons with a brown body and white wings; when disturbed they utter a croak. Pheasants brought to market.—20. The white herons disappear at times and then return again, but not in great numbers; they are perhaps guided by the state of the weather.—23. Pair of Woodpeckers seen on a tree, small, brown colour.—24-30. A Dragon-fly struggling on the ground: a Diadem-spider had stole on it while asleep and gummed two wings to each other, and to its

own body.—Found a few of the *Searabeidæ* in a heap of cow-dung—not usual in China to leave the dung long enough for beetles to lay their eggs in it.—Cabbage butterflies now begin to make their appearance.—The song



of the *Turdus occipitalis* heard in the coppices, on the peach and other trees, uttering a grating note.—Long-tailed Jay feeds on the berries of the tallow-tree. The untiring activity of this bird remarkable.—Tosterops, or "White Eye," seen, fond of suspending itself as if in search of insects; the habit continues in the cage, where it is fed on Water-boatmen.—Ant-like Attus, a new genus, found in Ants' nests: it is a spider exactly like an Ant in figure, attitude, and place of abode.

General Remarks.—5. Cooks and victuallers busy in preparing soups of every variety for the labourers who bring goods to market and fetch manure back. A basin is sold for 4 cash. A working man can eat four of these basins at a time, if very hungry six; so that he has a hearty meal for less than a penny. The lowest earning of a poor man is a groat per diem.—9. Visit a kiln where shells of all kinds are burnt for lime. Fire blown by revolving vanes like a dressing-machine.—16. Visited a Tobacco Manufactory, and remarked that the press somewhat resembles that used by paper-cutters in England; but pressure is not effected by means of a screw, but with the help of ropes and levers.—19. The leaves are cut into "Shag Tobacco" here; but the stems are closely packed and sent to Ningpo, where they undergo a process which the workmen of that city alone understand. A part of the Tobacco thus made is brought back to this port.—23. Country people put on thick clothes and shut their doors.—24. Foam floating down the river.—25. The splitting of bamboos for the manufacture of salt-bags furnishes employment for many hundreds; each half is divided into ten wickers. Day's wages 140 cash.—27. Consulted as to the site of a grave under an impression that I must be well versed in such matters. Much good or much evil is thought to betide the survivors from a right or wrong position.—30. Keang-se practitioners in this "te-le" and "fung shwuy," or soothsaying, from the influence of the earth's local modalities, get large monies by the trade; but as they do not agree among themselves the people are fain to ask counsel of the stranger.

Outlines of Calendar for December, 1844.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
1	66	66	29,95	..	Objects exposed to atmospheric currents, damp. ..	A.M., W.; noon, N.	Dull and drizzling. One of the gloomiest days we have had. Clouds hanging at the foot of the hills.
2	66	66	29,97	..		A.M., S.E.; P.M., N.E.	Morn drizzly; clouds very low; P.M. rain.
3	63	64	29,96	..	Wet clothes refuse to dry.	A.M., S.E.; P.M., E.	Rain in preceding night. A thick fog with a few blinks of light aloft amidst rain. P.M., a heavy shower with a huge volume of vapour moving from east to west.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
4	62	68	29,97	..	Damp.	A.M., N.E.; noon, S.E.	Sky mautled with clouds; lifting; no rain.
5	66	72	29,90	29,97	Less damp.	S.E.	Sun seen at sunrise with promise of a fine day. Mid-day fine; rain in the evening.
6	64	64	29,94	..	..	"	Rainy morning; wind cold.
7	58	58	30,00	..	..	S.E., light airs.	Cloudy day, with some rain.
8	56	61	30,00	..	Drier.	"	Blue sky and sunshine.
9	56	63	30,00	29,94	..	S.E.	Day fine.
10	58	65	29,95	29,91	..	"	Clear and cheerly.
11	59	76	29,91	29,95	Dry.	A.M., N.E.; P.M., W.	Bright and clear, a copious dew on the grass. Air warm and sweet to seuse.
12	62	65	30,01	..	..	A.M., N.W.; noon, S.; strong breezes.	Body of the sky blue; clouds in flakes, connected like waves of the sea, thicker edge towards the eye.
13	50	56	30,16	..	..	S.E., stroug breezes.	Haze of a peculiarly greasy kind, apparently the presage of a gale.
14	52	65	30,01	..	..	N.E., gentle breezes.	Clear; dew on the grass.
15	56	68	30,01	..	..	"	Clear aloft; moisture on the grass from a low mist.
16	66	78	29,80	..	..	N.E., noon, S.E.	Clear and warm.
17	62	..	29,89	..	..	A.M., S.; P.M., N.	Rain more or less all day.
18	49	..	30,15	..	Very damp.	N.E.	Rain in the preceding night; day thick and cloudy.
19	48	52	30,15	30,07	Less damp.	N.E., strong breezes.	Thick and rainy; P.M., clouds lifting; day on the whole cold and comfortless.
20	52	60	30,03	..	..	N.E.	Thick and rainy, with some blinks of promise.
21	56	58	30,03	..	..	"	Heavy rain in the previous night; day gloomy.
22	54	54	30,16	..	..	N.E.	Dull, cold, and cheerless.
23	54	54	30,16	..	..	N.	Rainy and cold.
24	56	56	30,01	..	..	"	Cloudy and cold; clouds in layers variously coloured.
25	52	52	30,06	30,09	..	"	Cloudy and cold; clouds wear the aspect common to those from the North, high, dark, and motionless.
26	44	52	30,20	..	..	"	Clouds of the same character as yesterday.
27	49	58	30,20	..	..	"	Same as the two preceding days.
28	49	58	30,16	30,12	..	"	Very clear sky; mild to sense.
29	56	64	30,09	..	..	"	Cloudy at first with mist over the city; fits of sunshine.
30	57	62	30,08	30,03	..	"	Clouds dark and high.
31	60	60	30,01	..	..	A.M., N.; noon, S.	Fine and clear.

Husbandry and Gardening.—1. Seedling plum and Longan trees set out. Sowing wheat over.—3. Saw a piece of ground that had been newly turned up with the plough. A kind of mustard with a curled leaf just springing up among a dressing of wood-ashes.—5. Setting out lettuce among garlick.—

6. Mustard in perfection.—7. Hoeing wheat and barley. Setting out the crisp-leaved Mustard.—11. Setting out the Coco or Caladium. It is propagated by offsets taken from a reserved bed in some spare corner.—24. A stillness prevails in the fields. Wheat, fresh and vigorous. Hoeing wheat still in places. Manuring and transplanting mustard.—28. Transplanting Tobacco; cutting Sugar-cane for eating unprepared.

Fruits and Flowers in Season.—1. King chae, or Celery, large and fresh-looking.—7. Found a mushroom with some of the beauty but little of the fragrance of its congener at home.—12. Marigold, or "Che tong kouk," i. e. Mid-winter Chrysanthemum, sold in bundles at the rate of two for 1 cash.—22. Glutinous rice made into cakes and called "chaw wong," in commemoration of midwinter and a thank-offering to heaven.

Animal Kingdom.—3. "Maw ky," a Crab with a lock of hair on each of its nippers, in the market. Eels plentiful in the market, as are Rays and Swimming-crabs.—7. The Tae-yu, or band-shaped silvery Sea-eel, in great abundance.—11. Saw a flock of Linnets with a yellow patch on their wing; they seem fond of perching on high trees; they were occupied in dressing their feathers.

General Remarks.—4. Foam, spars, wood, and chips floating down the river. Heavy rains inland may be inferred from this.—17. Pirates attacked a boat belonging to the "Tea Merchant" or Canton Agent, and robbed the partner who had been to buy tobacco-stalks at Leen Keang. These pirates have virtually letters of marque against their own countrymen, as the Government cruisers find it worth while to leave them alone.—22. Mid-winter festival. Crackers heard all night.

Outlines of Calendar for January, 1845.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
1	56	56	30,01	..	Less damp.	N.	Cloudy and chill.
2	58	69	29,98	..	..	"	Day dull; clouds dark and stratified with brownish edges.
3	62	62	29,93	29,96	..	S.	Soon after sunrise fine; as the day advanced sky became hazy, cold, and cloudy.
4	58	54	30,05	..	..	A.M., S.; P.M., N.W.	Cold and cloudy.
5	50	53	30,12	30,09	..	A.M., S.W.; P.M., S.E.	Cloudy, with intervals of sunshine.
6	50	54	30,15	30,14	..	N.	Cold and cloudy.
7	54	..	30,14	..	..	"	Clear.
8	48	..	30,20	..	..	"	Clear.
9	44	52	30,18	..	..	"	Clear aloft, hazy below.
10	45	53	30,20	..	..	"	Clear.
11	45	..	30,22	..	..	"	Clear.
12	48	..	30,17	..	..	"	Clear at first, afterwards cloudy.
13	56	66	30,06	29,96	Dry.	A.M., N.; P.M., S.	Clear.
14	55	..	29,96	..	..	N.W.	Clear.
15	55	..	29,96	..	..	N.	Cloudy.
16	60	..	29,96	..	..	A.M., N.; P.M., S.	Rainy.
17	60	..	Bar. not at hand.	..	..	N.	Rainy; mild to sense.

Day of Month.	Therm.		Barometer.		Hygrometric State.	Wind.	Atmospheric Phenomena.
	A.M.	P.M.	A.M.	P.M.			
18	60	..	Bar. not at hand.	..	..	N.	Cloudy.
19	60	..	..	29,84	..	"	Mixture of cloud and sunshine ; heavy rains during the previous night.
20	..	64	..	29,84	Damp.	"	Rain and mist, with a tendency to clear.
21	57	60	29,94	..	"	"	Misty and cold.
22	53	52	29,92	..	"	"	Cloudy.
23	Omitted.		..	..	"	"	Cloudy, with drizzling rain.
24	57	73	29,86	29,84	..	"	Strong breeze in the night ; moonlight ; day foggy.
25	60	62	29,80	..	..	"	Foggy.
26	62	..	29,85	..	..	"	Foggy.
27	55	54	29,91	..	..	W.	Foggy.
28	55	62	29,82	..	..	"	Foggy ; clouds aloft stratified, tinged with red—a light red on the distant mountains— still air.
29	57	66	29,88	..	..	"	Strong breeze in the night ; cloudy, with fog ; still air ; P.M. sunny.
30	59	..	29,85	..	..	"	Cloudy and mild.
31	50	70	29,85	..	..	"	Fine and sunny ; sultry ; radiation great, as indicated by the sun's rays being very hot.

Husbandry and Gardening.—1. Husbandmen occupied in transplanting Tobacco. Shallow holes are made about 18 inches apart; into this the seedling is set and watered with the usual manured preparation.—6. Lettuce still in course of transplanting in furrows that are drawn across each other so as to form a kind of trellis-work in picture.—10. Longan-trees sheltered by a rocket of straw spreading out below. The hoar-frost is supposed to fall from the sky, and, striking upon this contrivance, is dispersed. The reasoning of the peasant is founded upon the postulatum that cold in its accidents and operations resembles the electric fluid.—18. The landscape on the level grounds varied with patches of green and yellow; the former consist of wheat, the latter of the Pih-tsae, or white cabbage.—21. The transplanting of oleraceous plants and the cutting and dressing thereof, still provide occupation for the gardener.—28. Draining ponds for the sake of fish and the mud, which is used in manuring the soil.—29. Many acres of the land about the city fallow, as it is feared the crop of wheat would not be ripe soon enough to make room for the rice.

Fruits and Flowers in Season.—1. Pears from Shan-tung with little flavour: they are sold at 80 cash per catty.—3. Pnueloes, which acquire taste, smell, and ripeness by keeping, are now in perfection.—5. Oranges have acquired their full size and maturity.—10. The dried Jujubes from Shan-tung and other places now in season.—30. Green peas in flower; Wheat beginning to ear; Spike and Culm short.

Animal Kingdom.—1. The Ants that were seen clinging in a torpid state to the leaves and buds of some fir-trees, either expired in that position or, seizing an hour of sunshine, retreated to their nests.—4. Wasps and Hornets are no longer seen, and the Moths and Butterflies have bid farewell.—7. The Pied Starling and the Crested kind, with the Magpie, Crow, and Fishing-Hawk still utter sounds of joy, complaint, or sadness, as they find, miss, or

long for their peculiar sorts of food and entertainment.—Gad-flies, Sand-wasps, and a few Butterflies enticed out of their winter-quarters by the unusual mildness of the day.

General Remarks.—5. A lottery on the hills. As many poor people are quite undone by the seductive baits held out to them, the authorities endeavour to lay hold on the sellers of tickets, managers, &c., who choose a spot whence they can see their pursuers before they arrive.—6. The Consul calls upon the Tartar General. The luncheon consisted of many courses; all the viands in silver bowls kept hot by spirit-lamps of variously tinted flames.—7. “Woo te meaou,” a large temple outside the city, set on fire by a votary, who came with incense and candles to ask for a dream to guide him in the choice of characters for a lottery-ticket.

XVI.—*Memorandum concerning the Pine-apple Soil of the Bahamas.* In a letter from the Hon. John Campbell Lees, C.M.H.S., dated Nassau, New Providence, Feb. 8, 1845.

I SEND you a small box, containing a specimen of what is called here “Pine-apple-land;” a very red soil, and that *alone* in which the pine-apple will grow. We have two other kinds of soil here; one, a very white calcareous soil, consisting chiefly of finely pulverized Madrepore limestone, in which the maize or Indian corn grows remarkably well; and the other, a deep black soil, I believe almost entirely vegetable, and very light, in which many things grow luxuriantly, but in neither of them will the pine-apple grow at all.

The red soil does not, as far as pines are concerned, appear to be improved by manure. I planted several in the same bed, some without manure, and others with different proportions of stable-manure; between those in the natural soil and those *slightly* manured, I could perceive no difference; but beyond this, in proportion to the quantity of manure, so did the plants decline and turn white. I have tried plants in composts of charcoal and manure, and of charcoal, earth (calcareous), and guano, but without success; nothing seeming to suit them here but their favorite red soil.

From the great perfection to which the cultivation of the pine is brought in England, the analysis of this earth might lead to the suggestion of some manure which could be applied successfully to it *here*, for at present we have none; and, consequently, in a few years the soil is quite exhausted and useless, and requires, it is said, a period of fourteen years to recover, and then not perfectly.

Note upon the foregoing Communication, by EDWARD SOLLY, Esq., F.R.S., Professor of Chemistry to the Society.

The “Pine-apple soil,” sent by the Hon. Mr. Lees from New Providence, is of a light red colour, and evidently contains a

large quantity of oxide of iron. The soil is free from stones; and though it appears to consist in great part of a coarse ferruginous sand, on examination is found to contain no sand, being easily rubbed to an impalpable powder in a mortar, and showing no grittiness under the pestle. A portion of the soil, freed from the larger fragments of wood, roots, and bark which it contained, gave an analysis of the following composition, in ten thousand parts :—

Silica	.	.	.	3090
Alumina	.	.	.	2400
Oxide of iron	.	.	.	1832
Lime (chiefly as carbonate)	.	.	.	132
Magnesia	.	.	.	8
Potash in a soluble state	.	.	.	5
Potash combined with earthy matter	.	.	.	20
Phosphate of iron	.	.	.	9
Sulphuric acid	.	.	.	2
Chlorine	.	.	.	4
Ammonia	.	.	.	a trace
Organic matter	.	.	.	990
Water	.	.	.	1508
				10,000

The soil is chiefly remarkable for the unusually large proportion of oxide of iron which it contains; but in the absence of any analysis of the Pine-apple plant, no very accurate conclusion can be drawn as to the peculiar excellence of this earth for its cultivation. On first examining the soil, I had expected to find a large quantity of ammonia, for the absorption of which from the air it is well fitted, by the large proportion of oxide of iron which it contains; this, however, was not the case; the quantity of ammonia obtained by analysis was exceedingly small. I must postpone further observations on this subject until I am enabled to contrast the composition of the pine-apple plant with that of the soil which appears to be so peculiarly favourable to its growth.

XVII.—*A Notice of Simmons's Patent Hygrometer.* By the Vice-Secretary.

AT the Meeting of the Society in Regent-street, Feb. 17, 1846, Mr. E. Simmons, of Coleman-street, in the City of London, produced an Hygrometer contrived by him for Horticultural Purposes. Taking advantage of the well-known Hygrometrical properties of wood, the inventor adapted a thin strip of Mahogany, *cut across the grain*, to a pulley and spiral spring

connected with a vertical arm resembling the hand of a clock. This hand was made to traverse a dial-plate marked off into degrees, expressing the amount of moisture in the air between what is observed when the instrument is plunged in water on the one hand and exposed to excessive atmospheric dryness on the other. The accompanying figure, and the description following, taken from Mr. Simmons's Registration in the Patent Office, will further explain the nature of the instrument.

From trials made with this Hygrometer in the garden of the Society, it has been ascertained that it is much better adapted to Horticultural Purposes than any hygrometer yet in use. For strictly scientific purposes it is not indeed equal to Daniell's, because it is impossible to make two instruments which will work exactly alike; but it has the great advantage of being as easy to use as a thermometer, and the instruments will be quite as comparable as common thermometers themselves. In fact, differences between such contrivances, to the extent of two or three degrees, are of no practical moment.

In a trial made between Simmons's and Daniell's Hygrometer in the Orchideous House in the Garden, an unexpected result was obtained. Placed in the same situation the following were the observations:—

		Simmons's.		Daniell's.
Jan. 22.	Noon .	Wet .		Saturation.
"	4 A.M. .	Wet .		Saturation.

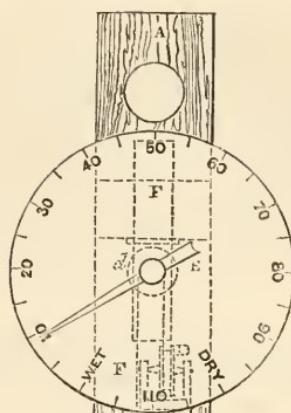
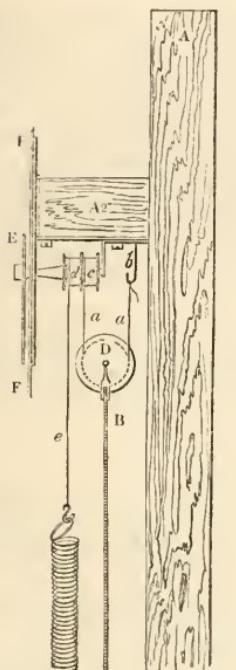
In the course of the night the evaporating tanks lost their water in consequence of the bursting of a pipe, and the observations that followed the accident were remarkable:

		Simmons's.		Daniell's.
Jan. 23.	8 A.M. .	1 .		Saturation.
"	Noon. .	6 .		do.
"	4 P.M. .	10 .		do.

Jan. 24. 8 A.M. . 50 . do.

In this instance the air must necessarily have become drier every hour, because the usual supply of vapour was cut off by the removal of the evaporating tanks; and yet Daniell's Hygrometer remained invariably at what is called "Saturation;" but Simmons's was faithful to the duty expected of it, and continued to indicate increasing dryness as the vapour suspended in the air diminished. Without pretending to explain this puzzling circumstance, it must be taken as valuable testimony to the efficiency of Mr. Simmons's Hygrometer.

Two of the instruments are in use in the Society's Garden, and continue to give satisfactory indications.



To be hung in the shade only.

Not to be subjected to greater heat than is suitable to vegetable life.
Not to be hung in the wet or damped with the syringe.

"A slip of wood is cut transversely with the grain, of about, or varying from 6 to 17 inches in length, according to the absorbing property of the wood employed; one end of the slip (BBB) secured to the frame or fabric (AAAA), at pin (C); but on the other end of the slip (B) is fixed a pulley (D), which is kept in its position by a line (*a a*), one end of which is secured to the frame or fabric by the hook (*b*), and passing through the pulley (D) affixed to the slip (B), thence round a small pulley (*c*) of about two-tenths of an inch in diameter, the axis of which carries a hand (E) to indicate on a dial (FF); inside, and affixed on the same small pulley, is another pulley (*d*) of the same size, and on the same axis, having a line (*e*) on it, drawn by a weight or spring (G), which pulls up the slip (B) tight; yet by its tension allows the dilation or contraction of the slip in its changes, giving motion to the hand indicating on the dial.

"The improvement claimed in this instrument consists in adapting the changes produced by moisture upon wood with a line through the medium of pulleys to give a legible indication to a hand on a dial, which renders it portable and convenient for scientific purposes and domestic usefulness."

XVIII.—*On the Culture of Epiphyllum truncatum.* By Mr. John Green, C.M.H.S., Gardener to Sir Edmund Antrobus, Bart., F.H.S.

(Communicated with a very fine specimen of the plant, for which a Banksian medal was awarded, January 20, 1846.)

To propagate the *Epiphyllum truncatum*, I prepare young healthy stocks of *Cereus speciosissimus*, and engraft them with the above in March, from one to two feet above the surface of the pots. I grow them in the stove till they are sufficiently large for flowering, which should be in about eighteen months from the time they are grafted. In the autumn of their second summer's growth I remove them from the stove to a cool airy part of the greenhouse, or, if the weather is fine, place them out on a south border out of doors; and, as winter advances, I diminish the quantity of water till they become quite dry. They remain in the greenhouse at rest till they are required for forcing.

Those that I require to flower first are removed back to the stove early in spring. As soon as they have matured the first growth, I place them in any exposed part of the garden. This change causes them to set flower-buds at the point of every shoot. As soon as the flower-buds are well established I place the plants in a warm shady part of the greenhouse, where they will flower profusely by the early part of October.

By removing the plants successively from their winter quarters to the forcing-house, and treating them as above mentioned, a succession of fine plants can be kept in bloom from October to March.

To those who esteem a collection of winter flowers, nothing can be more desirable than this *Epiphyllum truncatum*, E. vio-

laceum, and E. Russellianum, both which I grow in the same manner.

I have grafted the Epiphyllums upon several Opuntias and Pereskias, but I find the Cereus speciosissimus very superior to any other as a stock. It is more lasting, a strong grower, and very hardy; indeed I find it the best stock for all other Epiphyllums, and for the weak-growing kinds of Cereus.

I water all my Cacti when growing occasionally with guano-water.

XIX.—*The Method pursued in managing Erica hiemalis.* By
Mr. W. P. Ayres, C.M.H.S., Gardener to James Cook, Esq.,
F.H.S.

(Communicated February 17, 1846, with a very fine specimen, to which a Banksian medal was awarded.)

THE plant now exhibited was purchased, two years back, from Messrs. Fairbairn, of Clapham, for the sum of 1s. 6d., being then about six inches high, and growing in a five-inch pot. In February, 1844, it was potted into an eleven-inch pot, in a mixture of Shirley and Wimbledon peat in about equal quantities, using the soil as rough as possible, and with a liberal admixture of Reigate sand, charcoal in large pieces, and small pebbles.

Until it started into free growth it was kept in a moist and rather warm atmosphere; but during the summer it was grown in a low pit with free ventilation, and occasional shading in bright sunshine. On dull days and dewy evenings the lights were removed entirely, and during September and October it was fully exposed to the sun. Having, however, grown very freely, it showed but little disposition to bloom; and what few flowers were produced were removed before they expanded. In February, 1845, it was removed into the eighteen-inch pot in which it is now growing, and, during that season, was kept in the greenhouse, but was placed in the open air on all favourable occasions; indeed, it was not housed at all, except in very heavy rains, until after Christmas.

It has been in bloom nearly three months, but is now rather fading. I should not have sent it in this state, only at the earnest request of several members of the society. I must not omit to mention, that during the season of 1845 it was occasionally watered, say once a month, with a weak solution of soot and guano, used in a perfectly clean state. The guano used was Potter's, which I prefer to the imported, it being more uniform in its strength.

XX.—*Notes upon Begonias.* By Mr. James Donald; *pro tempore* Superintendent of the Hothouse Department in the Society's Garden.

THERE is, perhaps, no tribe of plants more interesting than this; for if they possessed no other merit than the beauty and duration of their flowers, that alone would be sufficient to recommend them to a place in every collection; but besides this, their leaves, perhaps, exhibit a greater diversity of form and colour than any other genus of plants in cultivation. Many of the species continue to bloom throughout the year, and those that only flower at certain seasons remain in beauty for a length of time. With all these merits it is surprising that the different species of so extensive a genus are not oftener seen grouped together and occupying a house by themselves; for until this is the case, their real worth as ornamental plants will not be fully appreciated.

In regard to their cultivation I may mention that Begonias are all stove plants, and that they enjoy a humid atmosphere of about 80° in summer, with a slight shade to break the rays of the mid-day sun. In winter the atmosphere should be kept dry, especially in cloudy weather, and the temperature allowed to fall as low as 58°. Although *B. Evansiana* and others will stand in a greenhouse, still even these species are much benefited by heat and moisture during the early part of the season. As to the soil most congenial to their nature, there appear to be various opinions. From experience I am satisfied that sandy loam and leaf-mould are the two principal materials, and for the kinds that grow luxuriantly these should be used in equal proportions. For some species, such as *B. coccinea*, which are liable to damp off, the quantity of vegetable matter may be less, and the deficiency made up with silver sand. Damping, however, cannot altogether be attributed to soil, but must be ascribed to bad drainage, or to moisture when the plant does not require it.

In preparing the pots some prefer small potsherds for drainage: this, in my opinion, is almost as bad as using sifted soil, for if the crevices are small they will be the more easily filled up. For an eight-inch pot, which may be taken as an average size for growing a specimen plant, the potsherds should not be less than three inches across; and if laid to the depth of two or three inches and properly covered with pieces of turf, there will be no danger of the roots suffering from damp, if water is judiciously given.

Begonias being in general plants of free growth and delighting in fresh soil, it is necessary to repot them twice in the course

of a year, viz., February and August ; but this rule, like many more in gardening, is not without an exception ; one plant may grow faster than another under the same circumstances, and therefore ought to be repotted when it requires it, nothing being worse for any plant than to cramp its roots.

As Begonias are generally intermixed with other plants, and receive a similar supply of water both in summer and winter, they may well present a sickly appearance. There are few plants that require a more liberal supply during summer than they do ; indeed some of the robust growing sorts will flourish with their pots half immersed in water ; but, like other plants, they require a season of rest, at which time comparatively little moisture is required. This period is clearly pointed out by nature. In October all the species with which I am acquainted begin to show that water should then be gradually withheld ; if it is continued, some begin to drop their leaves, others to decay at the root or assume a languid appearance : therefore it is obvious that they should be kept dry from the 1st of November to the 1st of February. During that time if water is given once or twice a week it will be sufficient, and the herbaceous sorts may be kept quite dry. Although many species remain green and healthy in winter, the growth they make is but trifling, nor should they be induced to grow, for if they are deprived of the season which nature has provided for their rest, the best of management will not compensate for it in twelve months afterwards.

There are some who imagine that a bushy plant cannot be produced, unless it has been cut down in winter or pinched back during the growing season, but this is a mistake. If *B. undulata*, or any of the fibrous-rooted sorts, which require pruning, are cut down in winter, the root will in all probability die, and if pinched back, when are they to flower ? To such as *B. Evansiana* the knife is never required, because the stems die down annually ; and it is never necessary to cut such as *B. heracleifolia* : therefore this matter rests with the tall-growing sorts. To explain this it will be necessary to consider what functions such stems perform. Take *B. undulata* for an example : every stem of one year's growth, notwithstanding its flowering, is a magazine in which secretions are stored for the support, during a certain time, of those which may arise from its base the following season, and thus the stems become analogous to the pseudo-bulbs in Orchids ; were this not the case, suckers would rise as strong without the stem as with it, and they would not be liable to damp off, although it should receive an injury. From this it is evident that all the pruning that is necessary is to cut out all the stems above two years old, and this should be done in spring when the plant is repotted in order to give room for the young shoots.

As to propagation, perhaps few plants are so easily increased as Begonias. All those from which cuttings can be taken will strike freely under ordinary treatment, and such as *B. Barkeri*, from which cuttings cannot be had, may be abundantly multiplied from seed. The seed should be sown when gathered, in light sandy soil, and placed in a moist situation, where the seedlings may be shaded from the rays of the sun.

As great confusion occurs among the names, one species often being known by three or four different names in as many establishments, I have been induced to offer the following plain descriptions of such of the species as are most generally met with :—

A. Stems none.

1. *B. rubricaulis*. Leaves all from the root, heart shaped, about five inches in breadth, of a dark green colour, and hairy on both sides. Flowers few, but beautiful, closely set together on the top of a foot-stalk of from eight to ten inches in length, covered with fine white hairs. This species in some respects resembles *B. albo-coccinea*, especially in the purple sepals and almost white petals, and, like it, blooms in autumn, and probably at other seasons.

B. Stems creeping.

a. Leaves palmate, equal at the base.

2. *B. heracleifolia*. Stems short and creeping. Leaves palmate, from fourteen to sixteen inches across, of a dark green colour, and hairy on both sides. The most remarkable feature in this species is the footstalks which support the leaves; they are generally about two feet in height, and covered with strong white hairs rising from crimson spots, which, along with numerous short bright green streaks, give the plant altogether a singular appearance. Flowers pink, in loose panicles, elevated on hairy footstalks about three feet in height. It blooms in spring.—*Mexico*.

3. *B. crassicaulis*. Stems rather short, thick, and fleshy, inclining to creep, of a dull green colour, when young thickly set with strong black hairs having all their points turned upwards. Leaves palmate, measuring about ten inches across, of a bright green colour, and partially covered with a soft brown substance beneath. Flowers white, produced in great profusion all over the stems. A deciduous species, flowering in spring before the leaves appear.—*Guatemala*.

b. Leaves ovate, equal at the base.

4. *B. fagifolia*, entirely covered with soft white hairs. Stems creeping, short-jointed, and of a dull crimson colour. Leaves

ovate, about two inches in length, remaining long on the stem. Flowers white, rather small, but produced in great profusion, and remaining in perfection about two months. This, although it only blooms in spring, makes a beautiful object when grown on a trellis. *Syn. B. pendula, B. repens.*—*Brazil.*

c. Leaves oblique, ovate, acute.

5. *B. manicata.* Stems rather short, inclining to trail, green when young, and marked with a few white streaks. Leaves oblique, fringed at the margin, of a bright green colour, smooth on the surface, but remarkable for the depressed crimson scales, which are suspended from the veins beneath, increasing in size and number towards the footstalk, and forming a ruff where they unite. Flowers pink, in loose panicles rising about a foot above the leaves. It blooms in spring.—*Brazil.*

d. Leaves oblique, obtuse, often round.

6. *B. stigmosa.* Stems short, inclining to creep. Leaves oblique, sometimes nearly round, from six to eight inches in breadth, curiously fringed at the margins, of a pale green colour, smooth on the surface, and beautifully marked with dark purple spots. The veins on the under sides, as well as the long footstalks, are covered with soft chaffy looking scales, giving the plant altogether a very mottled appearance. Flowers greenish-white, in loose panicles, rising six or eight inches above the leaves.

7. *B. Barkeri.* Stems very short and strong, lying close on the soil. Leaves unusually large, often a foot and a half across, and in form resembling a rhubarb leaf; smooth and shining on the upper surface, downy beneath, and supported by strong footstalks densely covered with dull green scales. Flowers white, produced in a huge mass on a footstalk upwards of four feet in height. It blooms in autumn, and at other seasons.—*Mexico.*

8. *B. ramentacea.* Stems short, and covered with depressed scales, which give them a very singular appearance. Leaves oblique, sometimes nearly round, from six to seven inches in breadth, dark green, and shining on the surface; crimson beneath, and covered with short forked hairs, gradually depressed towards the footstalks, which are covered in the same manner as the stems. Flowers pink, in loose panicles, consisting of twenty or thirty blooms. A handsome species, and one that appears to flower several times in the season.—*Brazil.*

9. *B. hydrocotylifolia.* Stems short, creeping on the soil in a congregated mass. Leaves about two inches in breadth, almost round, dark green, and shining above, crimson beneath, and covered with soft brown hairs, which gradually disappear as the

leaves become old. Flowers pink, on loose panicles, rising six or eight inches above the leaves. A very pretty species, flowering in spring, and remaining for a length of time in bloom.

e. Leaves oblique, peltate.

10. *B. albo-coccinea*. Stems short, inclining to creep. Leaves peltate, oblong, of a dark green colour, covered when young with soft brown hairs which soon drop off, leaving them quite smooth on both sides ; but still a soft substance clings to their footstalks, and gives them a rust-like appearance. Flowers in loose panicles of from thirty to forty blooms, elevated on footstalks about a foot and a half in height ; petals pure white, contrasting well with the sepals, which are bright scarlet, especially on the outside.—*East Indies*.

C. Stems erect, seldom branching.

a. Leaves digitate, equal at the base.

11. *B. muricata*. Stems rough, from three to four feet in height, and of a dull green colour. Leaves digitate, consisting of from six to eight leaflets, three or four inches in length, hairy on both sides. Flowers white, rather small, but numerous, forming a close panicle, elevated on a footstalk about eight inches in height, which, like the stem, is also covered with a rough hairy substance. It blooms in autumn, and probably at other seasons. Syn. *B. digitata*.—*Brazil*.

12. *B. digitata* in some respects resembles the preceding. Stems erect, about three feet in height, of a dull crimson colour when young, and thinly covered with soft white hairs. Leaves digitate, consisting of from four to eight leaflets, or sometimes entire, assuming the usual oblique form, smooth, and dark green above, bright crimson beneath, and scattered over with a few white hairs. Flowers white, scarcely different from those of *B. muricata*. It blooms in summer.—*Brazil*.

b. Leaves oblique, partially lobed.

13. *B. dichotoma*. Stems strong, from four to five feet in height, inclining to branch, rough and channelled. Leaves large, sometimes measuring ten inches across, unequally toothed, of a dark green colour, shining above, and smooth on both sides. Flowers white, in large clusters, suspended by long foot-stalks. Syn. *B. longipes*, *B. macrophylla*.—*Caraccas*.

14. *B. longipes*. Stems about five feet in height, very stout, becoming brown when old, and singularly dotted over with bright green spots. Leaves large, sometimes a foot in breadth, serrated, unequally lobed, of a dull green colour, and covered with short down-like hairs, especially on the under sides. Flowers white,

in clusters, suspended by very long footstalks, generally from the upper portion of the stem. Syn. *B. macrophylla*, *B. odorata*.—*Mexico*.

c. Leaves oblique, ovate.

15. *B. papillosa*. Stems about four feet in height, thinly covered with white bristle-like hairs, which, as the wood becomes hard, drop off, leaving the latter beautifully marked with short white streaks. Leaves oblique, about four inches in length, gradually tapering to a point, very rough, and of a dark green colour, thinly set with short ridged hairs on both sides. Flowers rose-coloured, produced in rather large clusters, hanging on slender footstalks from the upper portion of the stems. This species blooms occasionally in the course of the season, but never in great abundance.—*Brazil*.

16. *B. dipetala*. Stems erect, rather stout, about four feet in height, of a dull green colour, and singularly marked with small scarlet spots. Leaves oblique, about six inches in length, thinly set with short hairs on both sides, dark green, except the veins which, like the footstalks, are crimson. Flowers pink, in graceful clusters, suspended on footstalks from three to four inches in length. This, with the two preceding, blooms during the spring and summer months.—*East Indies*.

17. *B. Meyerii*. Stems hard and woody, about four feet in height, beautifully coated with soft brown hairs. Leaves oblique, from six to eight inches in length, very soft and woolly on both sides. Flowers white, produced in rather dense clusters, suspended by footstalks six or eight inches in length, which are covered with a brown substance similar to that on the stems. It blooms during the spring months.—*Brazil*.

d. Leaves oblique, ovate, peltate.

18. *B. peltifolia* grows about three feet in height, stems rather woody, and these with the leaves are thickly covered with a white woolly substance, giving the plant a very hoary appearance. Leaves peltate, about ten inches in length, very thick, and easily broken. Flowers white, in large clusters suspended by footstalks generally more than a foot in length. Syn. *B. pauciflora*, *B. acida*, *B. peltata*.—*Brazil*.

19. *B. vitifolia*. Stems strong, from three to four feet in height, seldom branched, of a dull green colour, and covered with a brown woolly substance which falls off as the wood becomes hard. Leaves peltate, about eight inches in breadth, generally concave, unequally toothed, and slightly woolly, especially on the lower side. Flowers white, hanging in large clusters from the upper portion of the stem. This, with the former, blooms during the spring months.—*Brazil*.

D. Stems erect, branching, fleshy at the base.

20. *B. homonyma*. Stems from two to three feet in height, enlarged at the joints, and forming a large fleshy base, from which the young shoots spring. Leaves oblique, about three inches in length, inclining to divide into four unequal lobes, smooth on both sides, and generally of a dark-green colour. Flowers pure white, generally in threes. This resembles *B. parvifolia* in habit, but may be at once distinguished from that species by its much larger leaves, which are always of a very dark colour. It blooms during summer and autumn. Syn. *B. sinuata*.—*Brazil*.

21. *B. parvifolia*. This species in almost every respect resembles the preceding, except that the stems grow somewhat more erect and are less disposed to branch. The leaves are of the same form and colour, and only differ in being about one third larger. The flowers individually are similar both in size and colour, suspended in little clusters varying in number from three to five blooms. This, with the former, may be kept in flower during the greater part of the year. Syn. *B. floribunda*, *B. semperflorens*.—*Cape of Good Hope*.

22. *B. Dregei* grows from two to three feet in height, much branched and swollen at the joints, especially towards the base. Leaves oblique, about an inch in length, very unequally toothed, quite smooth on both sides, and of a delicate green colour, passing gradually into a purple towards the margin. Flowers white, generally in pairs, and large in proportion to the size of the leaves. Syn. *B. parvifolia*, *B. floribunda*, *B. semperflorens*.—*Cape of Good Hope*.

E. Stems erect, branching, not fleshy at the base.

a. Leaves oblique, ovate, acute.

23. *B. Fischeri*. Stems branched, from two to three feet in height, dark crimson, and marked with a few small white spots. Leaves oblique, about two inches in length, slightly toothed, dark-green above, quite smooth, presenting a very silky appearance, bright crimson beneath, and singularly crossed with large green veins. Flowers blush coloured, very small, and generally in threes. It blooms in spring.—*Brazil*.

24. *B. rupestris*. Stems from two to three feet in height, small, but strong, of a brown colour when young, gradually becoming black, and resembling a bamboo in appearance. Leaves oblique, about three inches in length, waved at the margins, of a dark green colour, and beautifully marked on the surface with white silvery looking spots. Flowers pink, generally produced in spring.—*Brazil*.

25. *B. acuminata*. Stems somewhat slender, from three to four feet in height, rising in great profusion from the bottom, quite smooth, and very little swollen at the joints. Leaves oblique, about three inches in length, rather narrow, and very unequally serrated. In general they are of a lively green colour, tinged with crimson, especially the veins beneath, which are thinly covered with white hairs, extending down the footstalks. Flowers pink, in clusters of from eight to twelve blooms, springing from the axils of the leaves, on the upper part of the stems. It continues to bloom through the whole year.—*Jamaica*.

26. *B. hirtella* resembles *B. acuminata* in habit. Stems from three to four feet in height, quite smooth, and slightly striated. Leaves oblique, serrate, from two to three inches in length, of a shining pale green colour, and hairy on both sides. Flowers almost white, in small clusters, generally produced towards the top of the stems. It blooms during the summer months. Syn. *B. acuminata*.—*West Indies*.

27. *B. Martiana*. Stems herbaceous, from three to four feet in height, a little swollen at the joints, of a pale green colour, and marked with a few short white streaks. Leaves oblique, from two to three inches in length, unequally toothed, and covered with a glaucous bloom. Flowers pink, generally in pairs, but in great profusion. This very showy species blooms during the summer and autumn months. Syn. *B. diversifolia*.

28. *B. incarnata*. Stems about four feet in height, swollen at the joints, quite smooth, and marked with a few short white streaks. Leaves oblique, about six inches in length, dark green, waved at the edges, and thinly set with short hairs on the surface and margins. Flowers pink, in clusters of about sixteen blossoms, suspended on footstalks about four inches in length. Blossoms throughout the season.—*Mexico*.

29. *B. zebrina*. Stems strong, from three to four feet in height, channelled, of a dull crimson colour when young, and marked with a few pale green streaks. Leaves oblique, about six inches in length, bright green on the surface, beautifully marked with dark green shades underside; smooth and shining. Flowers pink, in clusters, suspended by rather short footstalks. Syn. *B. undulata*.—*Brazil*.

30. *B. Evansiana*. Stems herbaceous, from three to four feet in height, enlarged at the joints, which are of a bright crimson, in other parts they are of a pale green colour. Leaves oblique, from five to six inches in length, dark green on the surface, and red beneath. Flowers pink, produced in loose panicles, which continue in beauty from May to September. A common species often to be found in great perfection in the window of the cottager. Syn. *B. bulbifera*, *B. discolor*.—*China*.

31. *B. undulata*. Stems about three feet in height, gradually tapering towards the top, seldom branching the first year, of a pale green colour, quite smooth, and marked with short white streaks. Leaves oblong, from four to five inches in length, waved at the edges, pale green, smooth and shining on both sides. Flowers white, in large clusters, hanging down from the upper portion of the stems. It blooms in autumn.—*Brazil*.

32. *B. argyrostigma*. Stems from three to four feet in height, of a dull green colour, quite smooth, and marked with numerous narrow white streaks. Leaves oblique, about eight inches in length, dark green, quite smooth, and singularly blotched on the surface with silvery spots. Flowers almost white, produced in loose clusters, suspended by rather slender footstalks, generally from four to five inches in length. It blooms in spring and summer. Syn. *B. maculata*, *B. punctata*.—*South America*.

33. *B. odorata*. Stems about three feet in height, of a pale green colour, faintly striated, and tinged with crimson at the joints. Leaves oblique, about eight inches in length, bright green, quite smooth and shining, especially on the under side. Flowers pure white, in large clusters, suspended on rather slender footstalks, generally on the upper portion of the stems. Syn. *B. suaveolens*, *B. sinuata*. It blooms during the spring months.—*South America*.

34. *B. sinuata*. This is closely allied to *B. odorata*; the stem, leaves, and even the flowers appear to be very much alike in both species, and both bloom at the same season, but it differs from *odorata* in having the veins on the under sides of the leaves, and also a portion of the footstalks, slightly hairy. Syn. *B. odorata*.—*South America*.

35. *B. nitida*. Stems woody, long, and straggling, requiring a trellis to keep them up, and generally becoming bare at the bottom. Leaves oblique, from five to six inches in length, of a bright green colour, and smooth on both sides. Flowers pink, in clusters of from twenty to thirty blooms, suspended by footstalks about ten inches in length.—*Penang*.

36. *B. aptera*. Very like *B. odorata*, except in the stems, which are quite green, and apparently more disposed to branch. Leaves oblique, about six inches in length, quite flat and rather long pointed; of a bright green colour, smooth and shining. Flowers white, and produced in graceful clusters, similar to those of *B. odorata*. Like the preceding it blooms during summer and autumn.

37. *B. laurina*. Stems very strong, about four feet in height, branching, green when young, and marked with a few white spots. Leaves oblique, about two inches in length, beautifully serrated, dark green, and smooth on both sides. Flowers pink,

in rather small clusters, but suspended in a graceful manner from the lateral branches. This, with the two preceding, blooms during the summer months.

38. *B. sanguinea*. Stems about three feet in height, of a dull crimson colour, and quite smooth. Leaves oblique, about six inches in length, dark green above, bright crimson beneath, and smooth on both sides. Flowers almost white, produced in clusters of from twenty to thirty blooms, suspended on footstalks from four to six inches in length. It blooms in summer and autumn.—*Brazil*.

39. *B. coccinea*. Stems from two to three feet in height, quite smooth, of a dull crimson colour, and marked with a few pale green streaks. Leaves oblique, about six inches in length, glaucous, and green on both sides. Stipules large, of a pale green colour, and membranaceous. Flowers bright scarlet, in loose panicles, rising from the axils of the leaves towards the top of the stem. Syn. *B. rubra*.—*Brazil*.

40. *B. ulmifolia* grows about three feet in height, branched, of a pale green colour, and thinly covered with short hairs. Leaves ovate, about three inches in length, serrate, pale green, and hairy on both sides. Flowers blush coloured, in little clusters, suspended by short footstalks from the upper portion of the stem. It blooms during summer and autumn.—*South America*.

41. *B. castaneæfolia*. Stems branched, slender, somewhat swollen at the joints, of a dull green colour. Leaves ovate, about an inch and a half in length, serrate, pale green, and smooth on both sides. Flowers blush coloured, borne on short spurs which are produced in autumn. Although this species flowers only in spring, and then not in such profusion as many others, still it possesses a neat habit which renders it a desirable addition even to a small collection.—*Brazil*.

b. Leaves ovate, obtuse, often equal at the base.

42. *B. semperflorens*. Stems almost herbaceous, of a pale green colour, and between two and three feet in height. Leaves about two inches in breadth, nearly round, differing very much from the usual oblique form, bright green, smooth and shining on both sides. Stipules rather large, often adhering to the stem after the leaves have dropped off. Flowers pure white, in short panicles, rising from the axils of the young leaves. This is a very pretty species. Syn. *B. Hookeri*, *B. spathulata*, *B. grandiflora*.—*Mexico*.

43. *B. cucullata*. Stems from two to three feet in height, smooth, of a dark green colour, and slightly tinged with purple at

the joints. Leaves oblique, quite blunt, from three to four inches in length, dark green, and smooth on both sides. Stipules very large, fringed, and of a pale green colour. Flowers resemble those of the preceding species, and it also keeps in bloom the greater part of the year. Syn. *B. spathulata*, *B. semperflorens*, *B. grandiflora*.—Brazil.

INDEX of the foregoing Names and Synonyms. (The latter are in *italics*.)

Begonia <i>acida</i>	.	.	.	18	Begonia <i>macrophylla</i>	.	.	14
" <i>acuminata</i>	.	.	25	" <i>maculata</i>	.	.	32	
" <i>acuminata</i>	.	.	10	" <i>manicata</i>	.	.	5	
" <i>albo-coccinea</i>	.	.	10	" <i>Martiana</i>	.	.	27	
" <i>aptera</i>	.	.	36	" <i>Meyerii</i>	.	.	17	
" <i>argyrostigma</i>	.	.	32	" <i>muricata</i>	.	.	11	
" <i>Barkeri</i>	.	.	7	" <i>muricata</i>	.	.	12	
" <i>bulbifera</i>	.	.	30	" <i>nitida</i>	.	.	35	
" <i>castaneafolia</i>	.	.	41	" <i>odorata</i>	.	.	33	
" <i>coccinea</i>	.	.	39	" <i>odorata</i>	.	.	14, 34	
" <i>crassicaulis</i>	.	.	3	" <i>papillosa</i>	.	.	15	
" <i>cucullata</i>	.	.	43	" <i>parvifolia</i>	.	.	21	
" <i>dichotoma</i>	.	.	13	" <i>parvifolia</i>	.	.	22	
" <i>digitata</i>	.	.	11	" <i>pauciflora</i>	.	.	18	
" <i>digitata</i>	.	.	12	" <i>peltata</i>	.	.	18	
" <i>dipetala</i>	.	.	16	" <i>peltifolia</i>	.	.	18	
" <i>discolor</i>	.	.	30	" <i>pendula</i>	.	.	4	
" <i>diversifolia</i>	.	.	27	" <i>punctata</i>	.	.	32	
" <i>Dregei</i>	.	.	22	" <i>ramentacea</i>	.	.	8	
" <i>Evansiana</i>	.	.	30	" <i>repens</i>	.	.	4	
" <i>fagifolia</i>	.	.	4	" <i>rubra</i>	.	.	39	
" <i>floribunda</i>	.	.	21	" <i>rubricaulis</i>	.	.	1	
" <i>floribunda</i>	.	.	22	" <i>rupestris</i>	.	.	24	
" <i>Fischeri</i>	.	.	23	" <i>sanguinea</i>	.	.	38	
" <i>grandiflora</i>	.	.	42	" <i>semperflorens</i>	.	.	21, 22, 43	
" <i>grandiflora</i>	.	.	43	" <i>semperflorens</i>	.	.	42	
" <i>heracleifolia</i>	.	.	2	" <i>sinuata</i>	.	.	20, 33	
" <i>hirtella</i>	.	.	26	" <i>sinuata</i>	.	.	34	
" <i>homonyma</i>	.	.	20	" <i>spathulata</i>	.	.	42, 43	
" <i>Hookeri</i>	.	.	42	" <i>stigmosa</i>	.	.	6	
" <i>hydrocotylifolia</i>	.	.	9	" <i>suaveolens</i>	.	.	33	
" <i>incarnata</i>	.	.	28	" <i>ulmifolia</i>	.	.	40	
" <i>laurina</i>	.	.	37	" <i>undulata</i>	.	.	29	
" <i>longipes</i>	.	.	13	" <i>undulata</i>	.	.	31	
" <i>longipes</i>	.	.	14	" <i>vitifolia</i>	.	.	19	
" <i>macrophylla</i>	.	.	13	" <i>zebrina</i>	.	.	29	

XXI.—*An Account of Three new Varieties of the Apple.* By
John Williams, Esq., of Pitmaston, C.M.H.S.

(Communicated December 16, 1845.)

LOOKING over my fruit-room yesterday, I could not bring to my recollection whether I had sent specimens of a seedling apple which I raised from the kernel of what I believe to be the true Golden Pippin. The original tree has been in bearing eight or ten years, and appears to improve in quality by age. When first gathered from the tree this year, about the middle of October, I thought it contained more sugar and less malic acid than any apple I have ever met with; certainly much more sugar than the famed Cornish gilliflower. It is now getting a little past its best if used for the press, but as a dessert fruit it still preserves its firmness and saccharine quality. The tree grows with much vigour. I have named it the "*Pitmaston Golden Pippin.*"

With the preceding I have sent a few specimens of the *True Golden Pippin*, also grown in my garden, where it has fruited for several years past, the grafts of which I got from an old tree which was considered to be the true sort.

You will also receive a sample of a seedling raised from the Old Golden Pippin, I should think more than sixty years ago, by a Mr. White, of Witley, who for many years was the steward to the trustees of the late Lord Foley's father during the minority of the late Lord. It bears well, resembles its parent, but is a little larger. It is named the "*Pine-Apple.*"

A fourth sort I got upwards of twenty years ago from Mr. Foley's, of Stoke Edith, in the county of Hereford, where I saw the original tree growing in Mr. Foley's garden. It is known in my garden by the name of the "*Stoke Park Pippin.*" In character it so much resembles the Old Golden Pippin, that I think it must have been raised from a kernel of that apple. It bears well with me, but the wood is rather disposed to canker.

We have an Agricultural Association in Worcestershire, of which I am a member. We give an annual prize for the best seedling pear, either for the dessert or for making perry; also for the best apple for the table or cider. I have always been named as one of the fruit judges, and the way I test the merit of an apple or pear is by reducing the flesh of the fruit to a pulp, by means of a little wooden bowl and pestle. The reduced pulp is then placed in small quantities on an earthen dish, and exposed for about fifteen or twenty minutes to the air. This I have practised at home to decide on the merits of cider-apples for years past; but last October, at our exhibition, I told my two

fellow judges of fruit that I would save their teeth from the effects of tasting sour apples. I accordingly set to work, and having arranged the reduced pulp of about a dozen apples in rows on a dish, where, with a number corresponding with each fruit, it remained about fifteen minutes, I then pointed out which I expected we should all agree was the *best fruit* for the *press* by the *depth* of the *brown tint* assumed by the absorption of oxygen; and according to the experiments of Mr. Knight and Sir Humphry Davy, the absorption added to the sacch matter. If you were to reduce a small quantity of the flesh of my Pitmaston Golden Pippin, by scooping off a little of it with the point of a tea-spoon, a silver dessert-knife, or an ivory scoop, you will in about fifteen or twenty minutes find the pulp two shades at least of a deeper brown colour than that of the Old Golden Pippin under similar treatment.

Pitmaston, near Worcester, Dec. 16th, 1845.

[*Note by Mr. Thompson.*]—The *Pine-Apple* resembles the Old Golden Pippin in shape, but is larger; skin, rich orange-yellow, partially russeted; flesh, yellow, very rich and sugary; an excellent dessert apple. Its season of perfection may be stated from December till February.

The *Pitmaston Golden Pippin*, and the *Stoke Park Pippin*, very much resemble the Pine-Apple. All of them are more sugary, but not so juicy as the Old Golden Pippin. As first-rate dessert fruit they are highly deserving of cultivation.

It may be observed that a knowledge of Mr. Williams's experiments for ascertaining the merits of apples and pears may lead to useful results in other respects. It has been experienced that apples which cook of a white colour may be made to acquire a fine tint by paring and cutting a day before, so as to expose the juice to the action of oxygen, which, as Mr. Williams states, invariably changes the colour.

XXII.—Remarks on the Culture of the Pine-Apple. By John Povey, Gardener to the Rev. J. Thornycroft, of Thornycroft Hall.

(This communication was accompanied by three Black Jamaica Pines, weighing 4 lbs. 1 oz., 4 lbs. 11 oz., and 4 lbs. 12 oz. respectively, for which a Certificate was awarded on the 4th of November.)

THE soil which I use is good turfy loam mixed with about one-third well-rotted stable dung. For suckers I add a little white sand. My mode of growing the pine is this:—In the month of October

I prepare a small pit for suckers. I put them in pots according to their strength; the largest in pots about seven inches by six. By the end of November I have generally put in as many as the pit will contain. Nothing further is done to them except paying attention to heat and air, and occasionally giving a little water, until the following April. I am under the necessity of allowing them to remain here thus long in consequence of having to grow them under a late house of vines during the summer months; I then put them, the largest and best, into pots eleven inches in width by ten in depth; these I never pot again. The smaller ones are put into smaller-sized pots, and at a future time receive another shift. The pit under the vines being prepared they are taken there, where they never fail to make a good growth, and many of them even at that age show fruit. I cut one fruit in October last weighing 4lbs., besides the one now sent, from plants which were struck in October, 1844, and I have at this time forty plants of the same age in fruit, some of which are nearly ripe. The smallest of the plants are seldom more than two years before they ripen off their fruit: the two largest of the three sent are from plants of that age, and I have cut many this autumn equal to them. It is, however, perhaps, right to mention, that as soon as the plants show fruit they are removed to the fruiting-pit, which is heated with a common flue. I have no tanks for bottom heat, and I am therefore obliged to use fermenting materials. No liquid manure is employed except a little weak guano water, and I seldom shade my pines, but when I do a very thin canvass is thrown over the young plants only. I give air freely, and to the sucker-pit I give a little every fine day through the winter, but very little water. The sorts I grow are the Black Jamaica, the Providence, and the Montserrat; but more of the Black Jamaica than of the other kinds. The heat of my fruiting-pits in winter is 65° , and in summer 75° . Air is admitted when the heat approaches 90° ; the maximum temperature seldom exceeds 100° .

NEW PLANTS, ETC., FROM THE SOCIETY'S GARDEN.

19. PLUMBAGO ZEYLANICA.—W.

Received from Sir Henry Fletcher, and collected in the neighbourhood of Jellallabad in 1843.

A twining plant, with dull green striated branches closely covered with very fine particles of white efflorescence, turned out to be in no apparent circumstance different from the Ceylon Leadwort or from the climbing Leadwort of South America, neither of which seems to be distinguishable. The flowers are pure white, with a little point at the end of the lobes of their corolla. Its northern station appears, however, to indicate some constitutional difference, and this in fact occurs; for, as far as the experience of the garden has gone, the plant is probably hardy enough to withstand the winter if planted against a south wall.

It is rather a pretty plant, as it is likely to bloom freely, and prove hardy, or nearly so.

Sept. 8, 1845.

20. COCHLEARIA ACAULIS. *Desfontaines, Flora Atlantica,* vol. ii., p. 69. (*Cochlearia pusilla, Brotero, Phytographia Lusitanica*, p. 100, No. 45, t. 21, figs. 2 and 3.)

Received from the Duc de Palmella (Lisbon), in March, 1845.

It is found wild, according to Brotero, on the basaltic hills near Lisbon, and occasionally on the limestone formation of Estremadura. Desfontaines also met with it in Barbary.

A beautiful rock plant for shady situations; its flowers are of a clear lilac, and the foliage is of a delicate green colour. It propagates itself by seeds, and by runners which throw out roots abundantly into the damp soil.

It is a hardy little annual, growing in any rich garden soil, and blooming from April to October. It requires rather a moist situation. Its small flowers (they come out white and turn to a pale lilac) appear in profusion from April to October.

Sept. 19, 1845.

21. PRIMULA INVOLUCRATA. *Wallich Cat.*, No. 7107. *De Cand. prodr.* 8, 42.

Seeds of this were sent from the North of India by Captain William Munro, in April, 1845, under the name of *Primula spathulata* of Royle; but it is certainly identical with Dr. Wallich's *Primula involucrata*.

When at rest this plant forms a large egg-shaped bud, which may almost be called a bulb. Early in the spring it throws up a tuft of smooth shining leaves, the colour and texture of Pilewort, which are immediately succeeded by a scape from 6 to 9 inches high, terminated by three or four white sweet-scented flowers, which are at first slightly yellow, and when dying acquire a tinge of blush. In form, the leaves are long-stalked, ovate, obtuse, wavy, and slightly toothed. The involucre is remarkable for having its base extended downwards into a sheath, in the same manner as in Thrift. The corolla is about the size of a cowslip, with a flat border, whose segments are round and two-lobed, and a pink tube which is a little longer than the angular calyx.

It is a hardy perennial, growing about 6 inches high, in a soil composed of sandy-loam and leaf-mould. It will flower in the open border about March, but earlier if kept in a cool greenhouse or frame. It is stated by Capt. Munro that he collected it at an elevation of 11,500 feet, growing in the neighbourhood of water.

It will be a most desirable little plant for rockwork not too much exposed to a hot sun.

Feb. 24, 1846.

22. DAPHNE FORTUNI.*

A dwarf shrub, with lilac flowers, from the Chusan hills, Ningpo and Shanghai; received from Mr. R. Fortune, July 26th, 1844, who states that it is used by the Chinese in the same manner as the Mezereum in Europe.

This is a small downy-branched bush, with thin deciduous opposite and alternate ovate-oblong and oblong leaves covered with very soft fine hairs. The flowers, which appeared for the first time in January, 1846, are pale bluish lilac, arranged in

* *D. Fortuni*; foliis ovato-oblongis oblongisque hysteranthiis utrinque adpresso sericeis, floribus quaternis exinvolucratis extus sericeo-villosis, calycis limbo 4-lobo laciniis oblongis obtusis interioribus angustioribus.—J. L.

clusters of four upon branches scarcely beginning to put forth their leaves. They are rather more than an inch long, covered externally with soft, closely-pressed hairs, and divided in the border into four roundish, oblong, obtuse, uneven lobes, of which the two inner are the smallest. In the inside of the tube of the calyx are eight nearly sessile stamens in two rows, with narrow sharp-pointed anthers. The ovary is smooth, stalked, one-celled, with a small fleshy scale at its base, and a single suspended ovule: it produces abruptly from its summit a very short cylindrical style, ended by a capitate hairy stigma.

No species yet described approaches very nearly to this, which has been named after its enterprising discoverer. The seeds being unknown, it can only be conjectured that it belongs to the Mezereum division of the genus.

It is a greenhouse, or perhaps half-hardy shrub, and grows freely in a mixture of sandy loam and peat. During summer an ample supply of water should be given, and air at all times when the weather is favourable. In winter it must be kept quite cool, in an airy part of the house; and being deciduous, very little water will be required during the absence of its leaves. It may be propagated by cuttings of half-ripe wood under ordinary treatment.

It is a charming addition to our greenhouse plants, more especially since it appears to be well adapted for forcing.

January 26, 1846.

23. EDGWORTHIA CHRYSANTHA.*

A deciduous shrub, producing bunches of yellow sweet-scented flowers, from Chusan, &c.; from Mr. R. Fortune. Received April 9th, 1845.

This is a dwarf soft-wooded shrub, throwing up rod-like dull green stems from its base, and bearing the leaves exclusively near their ends.

The leaves are about eight or nine inches long, oblong-lanceolate, stalked, very dull green, and covered with fine hairs, so small and closely pressed to the surface that the naked eye fails to discern them. The flowers have not yet been produced in England; but Mr. Fortune's Chinese drawings and specimens show them to be bright golden yellow, something less than an inch long, covered with exceedingly thick hair on the outside, and collected into balls about two inches in diameter at the ends

* *E. chrysanthia*; foliorum costis minutissimè pilosis, calycis tubo clavato sericeo-villoso.—J. L.

of the shoots. He adds, that they are sweet-scented, and appear in Chusan in July. The limb of the calyx is divided into four smooth ovate obtuse lobes; the tube contains eight sessile stamens, arranged in two lines, and with the anthers turned inwards. The ovary is covered with thick hairs, oblique, one-celled, with one suspended ovule, and a little emarginate scale on the upper side of its base. Its style is thread-shaped, and loses itself in a subulate stigma.

The species is allied to *Edgeworthia* (or *Daphne*) *Gardneri*, a Nepal plant with a similar habit, from which it differs in having longer and more slender flowers, larger flower-heads, and a much more silky hairiness on the outside of the flower.

It is a greenhouse or half-hardy shrub; it grows freely in a compost of three parts sandy loam, and one of turf-y peat. A free drainage is necessary; for although it requires an ample supply of water during the summer months, it is liable to damp off if this point is not properly attended to. For a few weeks in winter very little water is required. It will probably be multiplied without difficulty from cuttings of young wood.

Being sweet-scented and a plant of free growth, it may be expected to prove a useful addition to our greenhouse or half-hardy plants belonging to the natural order of Daphnads..

Feb. 28, 1846.

24. AZALEA OVATA.*

From Chusan, where Mr. Fortune found two varieties;
“the one with white, the other with pink or lilac
flowers; both spotted and very beautiful.”

Among the early despatches from Mr. Fortune was received a drawing of this beautiful shrub, which, according to the Chinese artist, has most delicate pink flowers, of the size and form of the Davurian Rhododendron, growing in clusters at the end of the branches.

The original plants did not survive the voyage; but a packet of seed has furnished an abundance of young plants, which have been distributed extensively to the Fellows of the Society under the name of “Azalea 274.” The dried specimens received from Mr. Fortune enable the species to be positively determined.

It is entirely different in foliage from all the other Chinese

* *A ovata*; foliis ovatis nunc subcordatis petiolatis convexis nitidis atrovirentibus apice emarginatis mucrone interjecto, floribus pentandris, pedunculis glanduloso-hispidis unifloris ex axillis supremis, sepalis ovatis imbricantibus membranaceis glabris, corollâ ad basin ferè 5-partitâ laciniis oblongis subcordatis, filamentis hirsutis.

Azaleas ; for instead of the pale-green colour and abundant hairs which characterize them all, this has perfectly hairless leaves, unless in the seedling state, and they are of a very dark green. Their form, too, is quite distinct ; for instead of tapering gradually to the stalk they are abruptly ovate, or even in some cases almost heart-shaped.

The plant has been too recently acquired for any knowledge of its true habits to have been gained : but seedlings in the open air have borne the frost of last autumn, and it was considerable on two occasions, without having suffered in the least ; and if, as seems probable, the plant should not be inclined to push early, it will not only be a hardy evergreen, but one of the finest in the country.

Feb. 28. 1844.

25. FORTUNÆA CHINENSIS.*

From the hills of Chusan and Ningpo ; Mr. Fortune. "The Chinese use the fruit of this to dye the black colour of their clothes."

An empty cone of this singular plant was received some years ago from Dr. Cantor, by favour of Lord Auckland, then Governor-General of India ; and it was at that time supposed to belong to some unknown Conifer. Mr. Fortune rediscovered it, and sent home good seeds and dried specimens, and it now proves to be a plant like a *Rhus* in aspect, but in reality a most curious genus of the natural order of Juglands.

If, indeed, we could suppose a walnut to be pressed flat, reduced to the size and texture of a seed of the Alder tree, and then many such to be collected into a small cone, composed of hard, brittle, sharp-pointed scales, we should form artificially what nature has produced in this plant. The annexed figure will explain more particularly these facts, if it is borne in mind that Fig. 1 is a cone ; 2, one of the ripe nuts taken out and much magnified ; and 3, an inside view of the same ; for it will

* *FORTUNÆA*. Gen. nov. (*Nat. ord. Juglandaceæ*.) *Flores* amentacei monoici ; *Amenta* *mascula* lateralia, caudiformia, erecta, achlamydea, squamis foliaceis intus hirsutis (albis ?) basi tetrandra ; *feminea* terminalia, e squamis densè imbricatis erectis unifloris mucronatis glabris constantia. *Calyx* superus, 4-deutatus. *Corolla* o. *Ovarium* uniloculare, compressum, dipterum ; *ovulo* solitario erecto ; *stylo* brevissimo ; *stigmatibus* duobus linearibus patentibus. *Strobilus* oblongus, e squamis duris patentibus mucronatis pubescens constans. *Nuces* parvi, compressi, dipteri, putamine crustaceo fragili ; basi obliqui intrusi. *Semen* 1, erectum, cordatum, *cotyledonibus* lobatis complicatis, *radiculâ* superâ protrusâ.—J. L.

Fortunæa chinensis. Arbor (?) ; foliis pinnatis 4—5-jugis cum impari ; foliolis ovato-lanceolatis biserratis.—J. L.



be obvious that the latter might almost be taken for a walnut viewed through a diminishing glass.

This shrub or tree, for it is uncertain which it is, is perfectly distinct from all the other genera of Juglands in having its male flowers in catkins, like those of a willow, composed of narrow scales, hairy, and apparently white inside, with 4 small stamens at their base (Fig. 5). The young nuts are small lenticular

bodies with a wing on each side, a minute superior four-toothed calyx, and a pair of short-spreading stigmas (Fig. 4); as the most remarkable genus found by Mr. Fortune during his Chinese expedition, it is proposed to give it the name of its indefatigable discoverer.

Whether or not it will be hardy is uncertain; at present the seedlings have been kept in the greenhouse; but the climate of the Chusan Hills and Ningpo leads to the hope that it may prove an arboretum plant, at least in the South of England.

26. AZALEA OBTUSA.*

Sent to the Garden by Mr. R. Fortune, July 26, 1844, as an Azalea, from Shanghai, with fine deep red flowers.

This charming shrub may be regarded as the gayest of all the red Chinese Azaleas in cultivation. It is a little bush, with very blunt leaves, both smaller and narrower in proportion than we find upon the species already in our gardens, and also smaller flowers, of the most glowing red. The latter have uniformly 5 stamens only, the characteristic mark of the genus Azalea, and thus seem to show that the additional number hitherto remarked in the Chinese species is a mere result of cultivation. The segments of the corolla are nearly oval and sharp-pointed; the upper one is not much smaller than the others, and is faintly blotched with purple.

Its high northern latitude would seem to indicate that this plant may be hardy, but it has hitherto been treated as a green-house shrub.

It will doubtless prove to be very useful, in consequence of its being a free flowerer, and of a dwarf habit.

Feb. 28, 1846.

27. AZALEA SQUAMATA.†

From the mountains of Hong Kong, whence it was sent by Mr. Fortune, as a fine and distinct species.

With the habit common to all the Chinese Azaleas this presents the following peculiarities:—In its natural state it blooms

* *A. obtusa*; foliis pilosis oblongis obtusis cum mucronulo basi angustatis, floribus solitariis pentaandris, sepalis patulis triangularibus villosis, corollæ laciniis acutis haud imbricantibus.—J. L.

† *A. squamata*; foliis junioribus ferrugineo-pilosis vetustis ovalibus acutis subcoriaceis breviter petiolatis calvis nunc basi angustatis, floribus 8–10-andris solitariis ante folia e squamis numerosis ferrugineis imbricatis pilosis erumpentibus, pedunculo squamarum longitudine villoso, calyce obsoleto 5-dentato, corollæ breviter campanulatæ petalis obtusis quinto multo minore.—J. L.

without leaves, producing at the end of every little shoot one or two large flowers of a clear rose-colour, distinctly spotted with crimson on one side, and guarded at the base by a large sheath of bright brown scales (whence its name). Its calyx, unlike that of the neighbouring species, is reduced to a mere five-toothed rim. Its ovary, immediately after the fall of the corolla, projects in the form of an oblong body quite covered with coarse brown hairs. The leaves when young are somewhat like those of *A. indica*, and have nothing distinctive in their shape or surface; but when old they are oval, sharp at each end, perfectly hairless, and as even on the upper surface as those of *Rhododendron punctatum*.

The plant has been long known from dried specimens and drawings sent from China by Mr. Reeves, the latter of which are preserved in the library of the Society: but it has never before been introduced alive. At present its flowers have only been produced by plants out of health, and therefore they have given no just idea of the beauty of the plant, which is one of the finest in cultivation.

This species will scarcely prove hardy. In a case, containing several plants, Mr. Fortune sent home a portion of the soil, *brown loam*, in which it was found growing wild, and for the purpose of trying its effects one plant was potted in it; but it has by no means the healthy appearance of those potted in rough sandy peat. It strikes freely from cuttings of young wood under ordinary treatment.

The beautiful spotted flowers and neat foliage, together with a dwarf habit, will render this a plant of considerable importance.

Feb. 28, 1846.

28. JASMINUM NUDIFLORUM.*

Received from Ninkin, from Mr. Fortune, July 24, 1844.

This is a shrub with angular deep-green trailing branches, which have little disposition to branch in the first year of their growth. The leaves are shining, deep green, and each consists of 3 sessile leaflets of an ovate form. They fall off early in the autumn, soon after which they are succeeded by large yellow scentless flowers, which grow singly from the buds formed in the axils of the leaves that have previously dropped. The limb of their corolla is about an inch in diameter, and divided into 6 broad, oblong, blunt, flat segments.

* *J. nudiflorum*; ramis angulatis vimineis, foliis hysteranthiis trifoliolatis glabris, foliolis ovatis acutis, floribus (luteis) solitariis basi squamatis, calyxis laciniis linearibus herbaceis, corollæ limbo 6-lobo obtusissimo.—J. L.

The species, although new to gardeners, is not entirely unknown, for it has been distributed in a dried state from the Imperial Russian-Chinese Herbarium, under the erroneous name of *J. angulare*.

It appears to be a greenhouse plant, and grows freely in almost any sort of soil, especially rough sandy peat. During summer an ample supply of water should be given to its roots, and it must be syringed over head once or twice a day. In consequence of its slender habit it is necessary either to train it on a trellis or to induce it to form an upright stem 3 or 4 feet high, so that the young twigs may hang down as they may be naturally inclined.

Being a free winter bloomer, and continuing in flower for a length of time, it will doubtless prove a good addition to our greenhouse plants.

December 16, 1845.

29. THE CHOLWELL PEAR.

Specimens of this were presented by Dr. Soper, Ashburton, Devon, on the 6th October, 1845.

The fruit is about 3 inches in length and $1\frac{9}{10}$ in diameter at the widest part of the section, which is about two-thirds of its length from the stalk. The form is curved pyramidal. Eye small, but open. Stalk from $\frac{1}{2}$ to $\frac{3}{4}$ inch in length, slender and obliquely attached. Skin smooth, thin, yellowish-green on the shaded side; faintly tinged and obscurely streaked with dull red next the sun, where it is also sprinkled with pale dots. The flesh is yellowish-white, melting, buttery, very sugary, and rich, with a musky flavour resembling that of the Seckel, or Henri Quatre; on the whole it most resembles the latter, but the skin is thinner and smoother, and the eye is not so much plaited. The end of September or beginning of October appears to be the period of its maturity. It will succeed as a standard, and is a good early pear worthy of cultivation, especially as it will fill up a blank which occurs in the supply at the time it becomes fit.

ROBERT THOMPSON.

30. THE CALABRIAN RAISIN.

This was obtained from the nursery of the Messrs. Baumann, of Bollwiller, on the Upper Rhine, where a great number of varieties of both wine and table grapes have been collected by the assiduity of the partners of that establishment, during their extensive travels throughout the greater part of Europe. This

variety appears to be amongst their more recent acquisitions, and is most probably new. Of late years the name of *Raisin de Calabre* has been introduced into their catalogue, with the remark that it is a delicious grape for the dessert. It was in consequence obtained as a fit subject for trial in the Garden of the Society. On fruiting, it was found to possess very desirable properties.

The bunch is large, slightly shouldered, long, and tapering. The berries are large, quite round, white, transparent so that the seeds can be perceived. The flesh is moderately firm, with a rich sugary juice. It is a late grape, possessing likewise the property of hanging long after it is ripe; and it will also keep for a considerable time after it is cut. With good management it may be preserved for months, in a fresh state, fit for the dessert. The vine grows vigorously, and is likely to be a good bearer. From what has already been observed of its disposition to form large bunches, those who make the production of them a principal object will doubtless grow bunches of this variety half a yard or more in length, as has been done in the case of the Black St. Peter's, comparatively with which, grown under similar circumstances, the Calabrian Raisin appears the larger of the two.

On account of its long keeping it is exceedingly suitable for being planted along with the Black St. Peter's above-mentioned, or Oldaker's St. Peter's as it is called by some, a vine well known as the variety cultivated by Mr. Oldaker, gardener to Sir Joseph Banks, at Spring Grove, as the best for hanging till February. But a variety that would keep equally long, and afford a contrast as regards colour, was wanted. The desideratum is admirably supplied by the introduction of the Calabrian Raisin.

This variety seems perfectly distinct from any hitherto cultivated or described. The White Nice produces very large bunches, but they are loosely shouldered; and the berries are proportionably smaller and of a greenish colour. The Syrian *Terre Promise*, or *Jews' Grape*, of which variety a bunch weighing 19½lbs. was produced at Welbeck in 1791, is likewise distinct from the one in question, the berries of it being perfectly round; whereas those of the Syrian are a little oval, not so white, less transparent, and coarser in substance. Taking into consideration the form and colour of the berry, the consistence of the pulp, and the flavour, the greatest resemblance is with the White Malvasia; but this is rather an early grape, and of much smaller size, being the variety which produces the Malmsey wine. The analogy in other respects is, however, such as to lead to the supposition that the White Malvasia has given rise to the Calabrian Raisin.

ROBERT THOMPSON.

31. THE WHITE-STEMMED AMARANTH.

Seeds of this were presented by Captain Hall, Berwick-upon-Tweed, with a communication, from which the following are extracts :—

“ The excellence of this vegetable consists in its succulence and tenderness, or freedom from any thing of a stringy, fibrous character. These qualities depend on being brought forward early by rapid growth, so as to be in a state fit for use in a month or so ; and this is effected by means of a rich and rather light soil, an ample supply of moisture, a moist still atmosphere, and high temperature—the latter may be varied occasionally as high as 90° in the daytime, and regulated at from 70° to 75° at night. With respect to light, the direct rays of the sun are not essential ; on the contrary, too much or constant sunshine is prejudicial ; a condition in which the direct rays are frequently intercepted by thin light clouds is more favourable to the rapid growth of this vegetable than unbroken sunshine.

“ The preceding remarks are based on the conditions which I have observed to be most favourable to the rapid development of this plant in India, where the best time for raising it in perfection is the early part of the monsoon or rainy season, just after the first fall of rain in June, when the ground has been well saturated with moisture ; and the parching state of the air, as it exists in the hot season, has given place to excess of moisture. At this period the atmosphere is usually calm, or only agitated with light breezes, and the sun generally obscured by a thin hazy cloudiness sufficient to intercept or break the direct rays, but transmitting considerable heat to the earth. This state of things often continues for six or eight weeks, only varied by occasional rainy intervals, the temperature in the shade ranging from 72° to 85° day and night. During the period just described, I have had plants of this Amaranth which attained full growth for use within a month from the sowing of the seeds, being at that time near one foot and a half high, and as thick in the stem as the middle or second finger. As the season advances—in August—it becomes less favourable to the growth of this vegetable ; a decided change takes place in the electrical condition of the atmosphere, the sun shines out more frequently and more brightly, the air becomes drier, and there is a manifest tendency in all succulent vegetables to acquire hardness and stringiness of fibre, and to run into flower.

“ I have entered into this minute detail of the natural season in India for the purpose of indicating the distinct conditions of climate necessary, on the one hand, for producing this vegetable for use ; and, on the other hand, for perfecting its growth with



Amaranthus albus.—The white-stemmed Amaranth.

a view to obtain seeds. A common melon-bed and frame, made sufficiently high inside for the plants attaining from one foot to one foot and a half in height, would be a suitable place for growing them in. The earth, rich and light, should be about three-quarters of a foot in depth, and the upper part of the fermenting materials in an advanced state of decomposition, to afford nourishment to the roots penetrating through the earth, which would greatly add to the luxuriance of their growth. The plants might be pricked out to about six inches distance from each other. As much sunshine is not wanted, it might be serviceable, in an unbroken succession of bright weather, to throw a thin light cloth over the glass during part of the day, to soften the intensity of the sun's light. The circumstance of a deficiency of sunshine or clear weather being rather advantageous than prejudicial, is favourable for the forcing of this vegetable in the early part of the year, when the weather is generally so uncertain and gloomy; and as it may be brought forward in the short space of a month or little more, a constant succession may be readily kept up by the use of only two frames. Of seed, I consider an ample supply might be obtained from one or two plants raised in April or May, which being allowed to perfect their growth and gradually enured to a drier atmosphere, would ripen their seeds in September or October.

" This plant is used as a vegetable for the table in *two ways*: 1st, the plants are pulled up and cut off just above the roots; the leaves are plucked off and dressed like spinach and other spinaceous plants, in which respect they are not inferior to any kind I am acquainted with. 2nd, the stems and side-branches (being the white parts of the plant) are separated from each other, cut into proper lengths, boiled, and placed on toast like asparagus, or simply in a dish, and eaten with meat, either with butter-sauce or meat gravy. They form a very elegant dish, and their inviting appearance is sustained by their succulency and tenderness to the taste, though possessing no particular flavour; and in my opinion they bear a favourable comparison with asparagus and sea-kale. In summer I consider this vegetable would be found very grateful.

" To acclimate this vegetable by successively raising from fresh seeds, ripened under circumstances progressively approximating the climate of England, would not, I think, be difficult; and my reasons for inferring that it might soon become adapted for ordinary garden culture in warm and sheltered situations are, that the plant is hardy and belongs to a genus of plants which are well known to be all of easy culture—that its period of culture for the table is comprehended in little more a month, for which therefore there is ample scope in the summer months—

that the moist and somewhat uncertain climate of this island is well suited to it, as it grows best in a moist climate, and under a clouded sky, if there be sufficient temperature, and artificial shade may be easily given under too much sunshine—and that as the whole duration of the plant is not more than six months from the time of sowing to ripening the seeds, a few plants, by being brought forward in March under protection, and afterwards planted, would be in a condition to perfect their seeds in the open air in September."

This plant grows to the height of two feet. Its stems are much branched, and both stems and branches are glabrous and beautifully white; leaves ovate; flowers pale green.

The seeds should be sown in rich light soil and raised in moderate heat. They may be planted out in frames, or potted in compost of rotten dung and light rich loam, and then grown in a viney or other forcing house. But there seems, at present, to be no prospect of the species succeeding as an esculent, in the open air. After being cut over the plants will push again so as to afford a second gathering.

M E M O R A N D A.

MANURES.

Phosphates.—To ascertain the effects of phosphates in different sorts of soil on the *Calluna vulgaris*, nine plants were potted in Bagshot peat, nine in Wimbledon peat, nine in Bromley peat, nine in Norwood loam, nine in Hanwell loam, and nine in common garden soil. Two plants in each sort of soil received nothing but water when they required it; the others, a small quantity of the following substances: phosphate of soda, phosphate of iron, phosphate of magnesia, and cow-dung. No perceivable change was caused by the substances. The only difference appears to have arisen from the different sorts of soil. Those in Bagshot peat and those in Norwood loam were the best; those in Hanwell loam next; those in Bromley and Wimbledon peat next; and those in common garden soil the worst.

Rhododendrons, treated with various salts.—Of 30 plants four were planted in peat, three in loam with a mixture of cow-dung; all the others in loam, 15 receiving the following substances: phosphate of iron, phosphate of soda, ammonio-phosphate of magnesia, sulphate of iron, and oxide of iron. Each of these substances was given to three plants in the proportions of 1 oz., $\frac{3}{4}$ oz., and $\frac{1}{4}$ oz., one half in autumn, the other in spring. The other eight plants received nothing but water when they required it. Those that received ammonio-phosphate of magnesia were much darker in colour than the others, in which little change took place. Eventually it was found that those plants which received ammonio-phosphate of magnesia were decidedly the best, especially the plant which had 1 oz. Those that received oxide of iron and those in peat were much the same, and decidedly the worst. Those in a mixture of loam and cow-dung and those treated with phosphate of iron, phosphate of soda, sulphate of iron, and pure loam were much alike, and quite intermediate between those that received ammonio-phosphate of magnesia and oxide of iron.

JAMES DONALD.

Hydrangeas.—The plants under experiment were nine in number, all potted in one sort of soil, and all in the same sized pots (6 in.). To eight of those a small quantity of the following substances was given: phosphate of iron, sulphate of iron, alum, caustic potash, phosphate of magnesia, and carbonate of potash. The plant which received $\frac{1}{4}$ oz. carbonate of potash died, also one which received $\frac{1}{2}$ oz. of phosphate of iron and 3 oz. of alum. The plant in pure soil produced large healthy leaves and a stem 2 feet 6 inches in height, terminated with two large masses of flowers. That in $\frac{1}{2}$ oz. phosphate of iron was 15 inches high, with leaves little more than half the usual size, petals considerably smaller but of the same colour, and flowers in great profusion. That in $\frac{3}{4}$ oz. of phosphate of iron was not different from the last. The plant in $\frac{1}{2}$ oz. of sulphate of iron was 11 inches high, its leaves green and healthy, its petals rather smaller than their usual size, heads dense, and large in proportion to the size of the plant, but no change in their colours. The plant treated with $\frac{1}{2}$ oz. of alum was 9 inches high, had leaves about half their usual size, petals in proportion, which were of a *pale blue colour*, and numerous branches, all terminated with dense masses of flowers. This plant stood in the conservatory seven weeks in bloom: $\frac{1}{2}$ oz. caustic potash formed a plant 2 feet high, very similar to those which received phosphate of iron; $\frac{1}{2}$ oz. phosphate of magnesia produced a plant 8 inches high, with leaves yellow all the season; the flowers were small, and dropped off as soon as they expanded.

JAMES DONALD.

NEW PEAS.

Adamson's New Matchless Pea.—Obtained from Mr. Glendinning, Chiswick Nursery, Turnham-green. A sort of white Marrow, an abundant bearer, growing about 6 feet high. Pods large, flat, approaching the shape of the scimitar pea, generally a little rough outside. Seeds 6 or 7. Requires a distance of 4 feet between the rows. A variety of excellent quality.

New Indented Marrow Pea.—Also obtained from Mr. Glendinning. A sort of green Marrow, rather tall, but not so strong-growing as Knight's. Pods flattish, with about 6 large green seeds of sugary quality. Should be sown 3 or 4 feet between the rows. Unquestionably a good variety; but further trial is necessary for comparison of its merits with those possessed by Knight's Marrow.

Pois à Cosse Jaune.—Obtained from M. Vilmorin, of Paris. A sort of sugar pea, the pods of which are used in the way of French beans. About 5 feet high. Calyx and pods yellow; the latter rather large, flat, somewhat pointed but not hooked, generally much curved, one side being convex and the other concave, tender, without a tough lining. Seeds 5 to 7, and may be counted without opening the pod, in consequence of the latter collapsing closely round them, so that in swelling corresponding projections are formed outside. The same mode of cultivation is required as is proper for other peas of a similar height. Curious, on account of the yellow colour of the pods; but, like other sugar peas, not likely to be thought very useful in this country.

Dancer's Monastery Pea.—This was presented to the Society by Mr. Dancer, nurseryman, Fulham, who states that he obtained it from a gentleman who procured it in Italy where it was cultivated at a monastery, and hence its name. It is a fine strong-growing variety, 6 or 7 feet high, bearing a succession of very large pods, rather flattened, somewhat resembling those of the white Marrow, containing 7 or 8 large seeds. It is later than the Auvergne; becomes fit for use about the same time as the Scimitar, sown the same day. As it grows strong and tall, it should not be sown at less than 4 feet between the rows; nor should the peas be too thickly sown in the rows. It is an excellent variety as regards productiveness, size, and quality.

ROBERT THOMPSON.

REPORT FROM THE COUNCIL

TO THE

ANNIVERSARY MEETING, MAY 1, 1846.

THE Council desire to take the opportunity afforded by the present Anniversary of giving some account of the progress which, since the last printed Report, has been made in carrying out the objects of the Society.

To the improvement of the FINANCES the Council have never ceased to give their first and most serious attention; and they trust that the Society will be of opinion that the means which have been taken for this purpose have been as effectual as would have been compatible with the other interests of the institution. The great object of the Council has been, to diminish the Society's debt without impairing its efficiency, or even for a moment suspending operations which have appeared necessary to carry out the objects for which a charter was granted. They have felt, indeed, that the most certain means of enabling the Society to reduce its liabilities, would be to enlarge the sphere of its utility.

On the 31st of March, 1840, the debt of the Society was 12,904*l.*; but on the 31st of March, 1841, in consequence of an outlay of 3197*l.* in buildings, the debt was increased by the sum of 1417*l.* 2*s.* 10*d.*; so that it then amounted to 14,321*l.* 12*s.* 10*d.* Subsequently it had been reduced, at the last anniversary, in the following sums:—

1841-2	.	.	.	£1,047	12	8
1842-3	.	.	.	708	10	4
1843-4	.	:	.	1,428	5	1
1844-5	.	.	.	1,579	5	9
						£4,763 13 10

So that the total amount of the liabilities of the Corporation then amounted to only 9557*l.* 19*s.*

This financial improvement in the Society's affairs was effected notwithstanding the continual expenditure of large sums in carrying out its objects, as will be apparent from the following detailed account of the new buildings constructed, or alterations and improvements effected in the Society's property:—

1. The great conservatory has been completed at an expense of something more than 2500*l.*, in addition to the sums mentioned in the Report of 1840.

2. All the hothouses and pits in the garden have been fitted up with hot-water apparatus, cisterns, evaporating-tanks, and improved boilers.
3. Various potting-sheds and similar buildings have been constructed, especially a large room for the reception of exhibitors at the garden, where they may be provided with refreshment.
4. Many new tents, tables, and other apparatus connected with the garden, have been purchased.
5. Several of the glasshouses in the garden have been altered, or almost reconstructed. The two iron curvilinear stoves, which formerly were placed back to back, and proved ill suited to plants, have been thrown into one, entirely rearranged in the interior, and thus converted into an excellent stove. The roofs of some of the wooden houses have been raised. A small and very inconvenient lean-to, formerly used as a pine-house, has been converted into a span-roofed greenhouse, fitted with slate shelves, and is now a building perfectly adapted to half-hardy greenhouse plants.
6. A considerable addition has been made to the glazed pits, all of which are now heated with hot water, with the exception of a few in which heat is not required.
7. The meeting-room in Regent-street, which in 1840 stood greatly in need of repair, has had an entirely new roof, and the interior has been re-arranged and decorated.

The actual cost of these works was as follows:—

1840-1	.	.	.	£3,197	7	7
1841-2	.	.	.	344	10	7
1842-3	.	.	.	341	19	4
1843-4	.	.	.	533	18	8
1844-5	.	.	.	353	5	10
						£4,771 1 2

It thus appeared that, while the debts of the Society had decreased to the extent of 4763*l.* 13*s.* 10*d.*, the value of its property had increased by the sum of 4771*l.* 1*s.* 2*d.*

The Council also reported, at the last anniversary, in connection with this part of the subject, that they had been able, in the year 1844, to convert the old 5 per cent. Bonds of the Society into 4 per cent. loan notes, to be discharged as funds might arise.

Such was the state of the Society's accounts in May, 1845. On the present occasion they show a deficit, the debt having increased to the extent of 448*l.* 12*s.* 6*d.*

This has arisen from the following circumstances :—

1. In consequence of the continued wetness of the summer of 1845, the number of tickets sold on account of the exhibitions was less than in the previous year by 2900, and the receipts were diminished to the extent of 587*l.* 7*s.*

2. On the other hand the expenses of the exhibitions unavoidably increased: refreshment was provided for the exhibitors, and a new room was built expressly for their accommodation, the latter at the cost of 150*l.* 16*s.* 2*d.* Unusual expenses for tents, tables, an orchestra, &c., were incurred to the extent of nearly 286*l.* The cost of the medals awarded exceeded that of 1844 by the sum of 279*l.* 10*s.*

3. The effect of this decrease of receipts and increase of outlay has been to diminish the balance on the garden exhibitions in favour of the Society to the extent of about 1168*l.* Had the same balance been realized as in 1845, the debt would have been diminished to the extent of 720*l.*, instead of being increased by 448*l.*

But the debt would not have been diminished to any greater amount, because of the following charges in the year now ended :—

Some alterations and improvements in the plant-	£.	s.	d.
houses at the garden amounted to upwards of . . .	350	0	0
The cost of Mr. Fortune's expedition has been . . .	689	17	4
That of Mr. Hartweg's new mission	220	2	10
Cost of the Journal	171	7	11
Law expenses incurred in the attempt, which failed, to establish the Society's right to exemption from local rates, &c., under the provisions of the Act of 6 and 7 Vict., c. xxxvi.	78	19	0
			—
	£1,510	7	1

The Council trust that the Fellows of the Society will agree with them in considering these expenses quite necessary. The small increase of debt which has taken place during the past year has obviously arisen from them, and from the operation of the temporary causes already explained; and the Council entertain a confident belief that the balance-sheet of 1847 will show as favourable a state of the Society's affairs as in former years.

The Council would have been glad to report that the amount

of arrears due by Fellows, and remaining unpaid, had been more diminished than it is found to be. The Council are still engaged in endeavouring, by the means at their disposal, to reduce the arrears still further; and they trust that their efforts will be eventually crowned by success.

The Council deem it necessary here to state, that the number of Fellows elected continues to be smaller than that of those who die, or for various reasons quit the Society; the number of Fellows at the present time being 1233, which is 19 fewer than at the anniversary in 1845.

It does not, however, appear that the prosperity of the Society is at present affected by this circumstance, so very large a portion of its income being derived from the Exhibitions at the Garden, which annually add a very considerable sum to the ordinary income of the Society derived from subscriptions and the admission fees of Fellows. The funds thus obtained have been so largely furnished that they have enabled the Council not only to reduce the debt to the extent above stated, and to maintain the efficiency of the Society, but also to expend very considerable sums in medals and rewards to meritorious gardeners.

The following return shows the number of visitors to the Garden Exhibitions in each year since 1840:—

1840.	May . . .	2,471	1843.	May . . .	4,818
	June . . .	11,594		June . . .	11,064
	July . . .	5,072		July . . .	7,568
		<hr/>			<hr/>
		11,137			23,450
1841.	May . . .	5,600	1844.	May . . .	4,367
	June . . .	8,957		June . . .	13,517
	July . . .	7,194		July . . .	6,596
		<hr/>			<hr/>
		21,769			24,480
1842.	May . . .	5,369	1845.	May . . .	3,641
	June . . .	13,351		June . . .	12,550
	July . . .	3,445		July . . .	6,186
		<hr/>			<hr/>
		22,165			22,377

From this it is seen, that notwithstanding the long period during which the exhibitions have continued, and the numerous rival assemblages which other societies have organized, the public interest in those at Chiswick is undiminished; for the Council believe that the falling off of 2900 visitors in 1845 was, as has been already stated, principally caused by the very unfavourable weather which occurred in May and July.

It appears from the report of the auditors, that the sum actually received on account of the Exhibitions in 1845 was 5030*l.* 8*s.*, the expenses of them being 3100*l.* 2*s.* 6*d.*, and the balance in favour of the Society being 1933*l.* 19*s.*

The following particulars show in what way the sum of 3100*l.* 2*s.* 6*d.* charged as expenses has been disbursed:—

	£. s. d.
Building a large room for exhibitors	150 16 2
Materials for orchestra, tables, &c.	89 19 10
Miscellaneous timber	5 19 9
New tents	196 8 1
Repairs of tents	3 10 0
Repairs of ladies' cloak-room	4 12 3
Oil, paint, &c.	17 14 0
New pump, &c.	4 0 10
Miscellaneous ironwork	41 8 10
Turf, gravel, &c.	18 15 6
Handbarrows, &c.	5 16 9
Hats given to men belonging to the garden	4 19 6
Carpenters, painters, tent-pitchers, &c.	208 0 10
Miscellaneous labour beyond what is required for the ordinary service of the garden	234 19 11
Hire of crockery	13 14 2
Miscellaneous printing	74 1 6
Admission tickets	41 4 6
Advertisements	101 11 6
Sundry petty payments	35 4 1
Carriage, postage, &c.	28 14 0
Stationery	10 15 11
Cloak-room expenses	6 13 0
Judges	48 6 0
Extra clerks and hire of temporary rooms	33 2 6
Police	118 2 0
Bands	342 2 6
Provisions for exhibitors	54 11 9
Watering roads	20 5 0
Medals	1,182 5 0
Miscellaneous	2 6 4
	<hr/>
	£3,100 2 6

If the money actually paid for the medals awarded at all the meetings since 1839 is inquired into, it will be found to amount to no less a sum than 5056*l.* 17*s.*, viz.:—

1840	.	.	.	.	£	717	5	0
1841	.	.	.	.		747	7	0
1842	.	.	.	.		716	15	0
1843	.	.	.	.		790	10	0
1844	.	.	.	.		902	15	0
1845	.	.	.	.		1182	5	0
					£	5,056	17	0

Not alone the Exhibitors in the Garden have been thus largely rewarded ; those in Regent-street, at the ordinary meetings of the Society, have also been constantly encouraged to exertion by a similar though less extensive distribution of prizes. And the Council confidently refer to the increasing skill in all branches of horticulture which this country presents, as the best proof of the advantages which such an application of the funds of the Society produces ; affording as it does, to all classes of intelligent gardeners, a continual opportunity of laying before the public, in the most advantageous manner, the result of their experiments ; and to nurserymen or others the means of bringing into notice the new plants which they procure.

The annual expense of medals awarded in Regent-street has been—

1840-1	.	.	.	.	£	108	14	0
1841-2	.	.	.	.		141	18	0
1842-3	.	.	.	.		117	10	0
1843-4	.	.	.	.		100	15	0
1844-5	.	.	.	.		87	0	0
1845-6	.	.	.	.		78	5	0
					£	634	2	0

In explanation of the decrease of charges under this head in the three last years, the Council refer to the discontinuance of a portion of the meetings of the Society during ten months of the year.

But while the exhibitions in the Garden and Regent-street have thus been amply provided for, the Garden itself has been maintained in a state of unimpaired efficiency. The Council may refer to the numerous works which have been carried on there, as has been already stated ; to the complete repair in which every part of it has been kept ; to the considerable distributions of plants and seeds which have been incessantly made to Fellows of the Society and others ; and to the large numbers of

valuable species which have continued to be introduced through the assistance of the Society's collectors and correspondents.

At the period of the last report, Mr. Hartweg's mission to Spanish America was drawing to a close; and in August, 1843, he returned to England. In addition to the plants formerly announced as having been sent home by Mr. Hartweg, the following, from among many others, may be more particularly mentioned.

<i>Fuchsia cordifolia.</i>	<i>Stenomesson Hartwegii.</i>
— <i>splendens.</i>	<i>Iochroma tubulosum.</i>
<i>Aristolochia gigas.</i>	<i>Gesnera vestita.</i>
<i>Achimenes pedunculata.</i>	<i>Cestrum aurantiacum.</i>
— <i>longiflora.</i>	<i>Thibaudia floribunda.</i>
— <i>rosea.</i>	<i>Comarostaphylis arbutoides.</i>
— <i>picta.</i>	<i>Pinus Ayacahuite.</i>
<i>Macleania longiflora.</i>	— <i>filifolia.</i>
<i>Tacsonia mollissima</i> , and 2 others.	— <i>oocarpoides.</i>
<i>Cotoneaster denticulata.</i>	— <i>tenuifolia.</i>
<i>Phædranassa chloracra.</i>	<i>Rigidella immaculata.</i>
— <i>obtusa.</i>	And a very considerable number of rare and beautiful epiphytes.
<i>Coburgia incarnata.</i>	
<i>Stenomesson aurantiacum.</i>	

The Fellows of the Society will recognise among these names many of the finest plants now in cultivation.

The occupation of Hong Kong and Chusan, and the opening of new ports in the Chinese empire, appeared to present so favourable an opportunity of acquiring valuable plants, that the Council deemed it advisable to send a collector to that country, which has for so many years been the richest of all fields in a horticultural point of view. In the spring of 1843, Mr. Robert Fortune, the superintendent of the hot-house department in the Society's Garden, having offered himself for the service, he was engaged to spend two or three years in exploring such districts as were accessible to Europeans. He sailed on the 26th of February, 1843, arrived at Hong Kong on the 6th of July, 1843, left it on his return to Europe on the 22nd of December, 1845, and is expected home in a few days. During his residence in China he received most valuable assistance from all those persons of influence to whom he was furnished with letters of recommendation, and the Council gladly avail themselves of the present opportunity of expressing the deep obligation of the Society, more especially to

His Excellency Sir John Davis, Bart., the Governor of Hong Kong.

The late G. Tradescant Lay, Esq., H. M. Consul at Amoy.

Capt. Balfour, H. M. Consul at Shanghai.

Major Malcolm.

Messrs. Dent and Co.

Messrs. Jardine, Mattheson, and Co.

John De Salis, Esq.

Robert Thom, Esq., H. M. Consul at Ningpo.

Messrs. Mackenzie, Brothers, and Co., Shanghai.

W. G. Maxwell, Esq., M.D., Madras Army.

John Cairn, Esq., Hong Kong.

Dr. Lockhart, Shanghai.

Mrs. White, Shanghai.

B. Butler, Esq., and Don Inigo, of Manilla.

Mr. Fortune has visited Amoy, Foo-chow-foo, Chusan, Ningpo, and Shanghai, besides the settlement of Hong Kong and the well-known country round Macao and Canton. He has lost no opportunity of examining the neighbourhood of those places, as far as the regulations of the Chinese government permitted; he saw the Azaleas in flower at Macao, the Tree Paeonies at Shanghai; spent some time in the Black-tea district of Fokien, and the Green-tea grounds of Ningpo, at the time when the leaves were gathering and drying at those places. He also paid a short visit to Manilla, whence he succeeded in sending a supply of Phalaenopsis, which has been distributed among the Fellows of the Society.

China not being a country of annuals, and having been already ransacked in some measure for the merchants resident at Macao, a speedy acquisition of new plants was never anticipated; nor for some time did it appear as if much progress would be made by the Chinese mission. By degrees, however, valuable plants began to arrive; the Chinese Buddleia, the gay Chirita sinensis, and the beautiful Anemone japonica excited attention; the arrival of Mr. Fortune's dried plants enabled the officers of the Society to ascertain that several of the shrubs, which had only just begun to recover from the effects of their long voyage, possessed great interest, and the Council can now report that the garden possesses, and in some instances has distributed, the following very valuable species, viz.;—

Cryptomeria japonica, a noble evergreen Coniferous tree, allied to a Cypress, and apparently quite hardy.

Two species of Viburnum, with heads of flowers resembling those of the Gueldres rose.

A beautiful new evergreen species of Forsythia, a genus previously unknown in Europe.

Twenty-two plants of Moutan Paeonies, among which are deep red, several shades of dark purple, and lilac varieties.

Platycodon grandiflorus, a fine herbaceous plant with large blue flowers, allied to *Campanula*.

A very fine *Scutellaria* from the gardens of Shanghai, with deep blue flowers, said to be as brilliant as *Verbena Melindres*.

Weigela rosea, one of the gayest of all shrubs.

Several fine *Azaleas*, among which *Azalea squamata* and *obtusa* have flowered, and *A. ovata* has been extensively distributed. The latter is an evergreen, apparently hardy, and certainly a plant of extraordinary beauty.

The true fingered citron, the large fragrant fruit of which is in great request among the Chinese.

Anemone japonica, an autumnal red-flowered herbaceous plant, of very gay appearance.

Daphne Fortuni, a species related to the *Mezereum*, with large quantities of charming lilac blossoms.

A rare and little known *Berberis* from Japan, with evergreen pinnated leaves.

Glycine sinensis, with white flowers.

Several *Roses*, among which is a fine new double yellow climbing kind from the north of China, and perfectly hardy.

Spiraea prunifolia, with double-flowers, and some other species.

Together with various other ornamental plants, some of which are from Japan, of which nothing is at present known.

Mr. Fortune has also added some esculents to our gardens, under the name of *Han-tsi* and *Hoosung*, the true *Santung Cabbage*, and some peaches and apricots, among which it is believed that the large Pekin peach is included. Up to this period he had sent home 43 cases of plants and seeds, chiefly collected in the north of China, besides several small packets which were sent by post overland.

Before leaving Hong Kong, Mr. Fortune despatched eight chests by the 'Duke of Portland,' which were received on the 6th of April; and he brings home the choicest part of all that he has found, in eighteen chests, under his own care. The journal which he has kept, in pursuance of his instructions, will be printed for the information of the public, and will doubtless add largely to our knowledge of the natural history of the Chinese Empire.

When Mr. Fortune's expedition was drawing to a close, the Council made arrangements for the despatch of a collector to California; and Mr. Hartweg has again sailed in that capacity. He left England on the 2nd of October, 1845, reached Vera Cruz on the 13th of November, the city of Mexico (by way of Xalapa) on the 3rd of December; and his last letters are dated January 16th, from Tepic, a town near the Port of S. Blas, on

the Pacific side of Mexico, where he had been most hospitably received by Messrs. Forbes and Co., merchants at that place, for whom he had been provided with letters from Dr. Forbes of London. Short as the time is which has elapsed since Mr. Hartweg's departure, he has already sent home some useful seeds and plants, especially some roots of a fine Achimenes, expected to prove either *A. patens* or *heterophylla*; *Mina lobata*, a rare and beautiful bind-weed; *Exogonium Purga*, the jalap-plant; three sorts of pines; the true *Pentstemon gentianoides*, which is different from that so called in gardens; a new *Epiphyllum*, supposed to be allied to *Ackermannii*; a *Macromeria*; an *Esco-bidia*; and several Epiphytes. The Council trust that when Mr. Hartweg shall have reached California he will reap a rich harvest of hardy plants, especially of the beautiful *Zauschneria* and the evergreen *Castanea*, to which his attention has been most especially directed.

The total cost of these expeditions has amounted to the sum of 3837*l.* 13*s.* 1*d.*: viz.—

1840-1	.	.	.	£	672	16	1
1841-2	.	.	.		372	5	1
1842-3	.	.	.		628	11	5
1843-4	.	.	.		423	19	0
1844-5	.	.	.		743	16	7
1845-6	.	.	.		996	4	11
							—
				£	3837	13	1

In the present year, however, Mr. Fortune's Chinese mission will terminate; so that some diminution of charge under the head of foreign missions may be expected in 1846-7.

The Council need hardly add that these and similar expenses are incurred entirely for the purpose of distributing the results through the country. In order to give additional effect to this operation, the charge of conducting it is intrusted to a separate department of the Garden, under the personal direction of Mr. Munro, the Society's principal gardener. During the period now under review these distributions have amounted to 42,584 plants, 308,371 packets of seeds, and 31,374 parcels of cuttings, as is shown in the following return. And the Council believe that this large gratuitous operation has been effected not only without any injury, but with considerable benefit to persons engaged in the trade of nurserymen.

Articles sent out from the Garden for the last 5 years.

			Plants.	Seeds.	Cuttings.
1840-41.	To Members . . .		8,794	47,641	6,671
	To Foreign Countries, Correspondents, &c. . .		445	1,060	366
	To Her Majesty's Colonies .		80	716	22
	Total . . .		9,329	49,417	7,059
1841-42.	To Members . . .		6,549	53,667	48,58
	To Foreign Countries, Correspondents, &c. . .		412	240	214
	To Her Majesty's Colonies .		..	94	22
	Total . . .		6,961	54,001	5,094
1842-43.	To Members . . .		6,246	47,764	4,893
	To Foreign Countries, Correspondents, &c. . .		190	586	125
	To Her Majesty's Colonies .		..	238	..
	Total . . .		6,436	48,588	5,018
1843-44.	To Members . . .		6,037	56,484	5,297
	To Foreign Countries, Correspondents, &c. . .		205	404	160
	To Her Majesty's Colonies .		..	395	24
	Total . . .		6,242	57,283	54,81
1844-45.	To Members . . .		6,451	52,046	3,967
	To Foreign Countries, Correspondents, &c. . .		131	319	150
	To Her Majesty's Colonies .		106	348	6
	Total . . .		6,688	52,713	4,123
1845-46.	To Members . . .		6,594	45,677	4,376
	To Foreign Countries, Correspondents, &c. . .		379	610	209
	To Her Majesty's Colonies .		..	82	14
	Total . . .		6,928	46,369	4,599

Among the plants obtained from the Society's collectors and correspondents, tropical Epiphytes have formed for several years

a very considerable proportion ; and the cultivation of these curious productions, abundantly distributed by the Society, has now reached in England a degree of excellence which twenty years ago would have been regarded as unattainable. The mission of Mr. Hartweg to tropical America has more especially been the means of procuring such plants in great abundance. The beauty of some of the species, the fragrance of others, and the singularity of all, would alone have justified the Council in making their acquisition an object of especial attention. But the Council have had in view another and a higher purpose. It has always been known to those who are conversant with the science of horticulture that the reason why the cultivation of Epiphytes should have so long been regarded as impossible was the difficulty of maintaining in hothouses an atmosphere similar to that which is experienced in the warm, damp, equable climates of the tropics ; that it was the very same difficulty which opposed the successful cultivation of the various kinds of tropical fruits which are scarcely known in this country even by name ; and that to overcome the difficulty connected with the one case would either be attended with success in the other, or at least would speedily lead to it. But Epiphytes obviously offered the gardener the greater inducements to exertion, not only because a fortunate result could be more quickly obtained from them, but because in reality the experiment was more attractive and much less costly than if it had been tried upon trees imported from the tropics in small numbers, with very great difficulty and at large expense. The Council of the Society therefore encouraged the cultivation of Epiphytes ; and the result has entirely justified their anticipations, for the principles applied to them have been gradually adjusted to all other tropical plants, a perfect command of the climate of forcing-houses has been attained, and, without neglecting Epiphytes, the country is now in a position to proceed to the more important business of cultivating tropical fruits for the table. Bananas are already common. Sir George Staunton has ripened Mangoes in perfection, as was formerly done by the late Lord Powis ; and his intelligent gardener has reduced the management of this fruit-tree to such certainty that all who have hothouses may grow it for the table if they please. The Council have taken measures to secure the introduction of improved varieties of the Mango, as well as of other fruit-trees : they are assured of the co-operation of the Governor of the Isle of France; of Dr. Wight, of Madras ; of Dr. Gardner, in charge of the Botanic Garden in Ceylon, and of others ; and they entertain a confident expectation that, in a few years, Mangoes and Mangosteens will be found at an English dessert in company with the pine-apple. One of the houses in the

Society's Garden will be appropriated to this kind of cultivation ; and the co-operation of the friends of horticulture in all parts of the world is solicited, so that Fellows of the Society, disposed to make tropical fruits the object of their care, may have the best opportunity of doing so.

In the year 1841 a few scientific Members of the Society agreed to subscribe various sums annually, for three or four years, for the purpose of forming a fund, out of which might be defrayed the expenses of conducting some inquiries into the chemistry of horticulture. His Grace the President most liberally contributed 50*l.* annually towards this charge, and the remainder of the sum required was made up by the following Fellows, in the proportions affixed to their names :—

The Duke of Devonshire	.	£50 per annum for 5 years.
Sir C. Lemon, Bart.	.	5 " "
Sir O. Mosley, Bart.	.	5 " "
Sir J. Sebright, Bart.	.	5 " "
R. H. Solly, Esq.	.	5 " "
John Rogers, Esq.	.	5 " "
Dr. Royle	.	1 " for 2 years.
Dr. Lindley	.	5 " for 5 years.
Dr. Henderson	.	1 " "
J. Wedgwood, Esq.	.	1 " for 1 year.
E. W. Pendarves, Esq.	.	2 " for 3 years.
E. Barnard, Esq.	.	1 " for 5 years.
E. Strutt, Esq.	.	2 " "
W. H. Pepys, Esq.	.	2 " "
S. Solly, Esq.	.	5 " for 1 year.
C. Webb, Esq.	.	A donation of 10 <i>l.</i>
W. Murray, Esq.	.	2 per annum for 5 years.
W. Ogilby, Esq.	.	1 " for 3 years.
Major Buckley	.	1 " "
J. Blunt, Esq.	.	£1 1 <i>s.</i> per annum for 5 years.
Thomas Farmer, Esq.	.	A donation of 5 <i>l.</i>
Sir G. Mackenzie, Bart.	.	2 per annum for 5 years.
L. H. Petit, Esq.	.	Two donations of 5 <i>l.</i> each.

The Council agreed to defray the charges of re-agents and travelling expenses to the extent of 20*l.* a year, and Mr. Edward Solly was intrusted with the investigations. Some very elaborate papers, issuing from this inquiry, have already been printed in the Transactions, others have appeared in the Journal, and more are still in course of preparation. The period, however, for which the Committee was organised having been already exceeded, it will be discontinued at Midsummer next, after having lasted for five years ; during which time Mr. Solly has on several occasions, in addition to his other duties, delivered lectures on horticultural chemistry in the meeting-room. But although the Chemical Committee will be dissolved at Midsummer next,

the Council have been desirous to preserve their connection with Mr. Solly, and have therefore appointed him Honorary Professor of Chemistry to the Society.

Among the means which the Council have deemed it expedient to take in order to increase the efficiency of the Society, has been the substitution of a Quarterly Journal, in an octavo size, for the costly quarto Transactions. The latter have always been published at uncertain intervals—and, of late years, in consequence of their expense, the period that has elapsed between one Part and another has been more than ever considerable: to remedy this, it has been decided that the Transactions shall be discontinued as soon as a complete Index of their voluminous contents shall have been prepared. That, in the meanwhile, and in future, there shall appear quarterly, on the 1st of January, April, July, and October, an octavo Journal, which shall contain papers on horticultural subjects, both theoretical and practical—an account of the proceedings of the Society—the result of experiments carried on in the Garden—a description of new plants introduced by the Society—the correspondence of collectors—and such other details as may appear likely to interest the public. Of this Journal two Parts have already appeared, and the Council trust that the measures which they have taken to ensure its utility and punctual appearance will prove effectual. It is not expected that the cost of this work will be smaller than that of the quarto Transactions if they had appeared annually, but the form and mode of publication of the Journal are believed to be better suited to the purposes to the Society and the wishes of the Fellows.

With a view to secure efficient co-operation in this work, the Council have recently recommended a considerable addition to the Corresponding Members of the Society, which recommendation was adopted at the meeting on February 17, 1846, when the following elections took place:—

- Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S.
- Mr. J. Barnes, gardener to The Lady Rolle, F.H.S.
- Mr. W. B. Booth, gardener to Sir C. Lemon, Bart., F.H.S.
- Mr. J. Brown, gardener to the Right Hon. Sidney Herbert.
- Mr. David Cameron, at the Botanic Garden, Birmingham.
- Mr. A. Campbell, at the Botanic Garden, Manchester.
- Mr. Thomas Corbett, gardener to Sir William Molesworth, Bart., M.P., F.H.S.
- Mr. James Duncan, gardener to Jos. Martineau, Esq., F.H.S.
- Mr. James Falconer, gardener to A. Palmer, Esq.
- Mr. R. Fish, gardener to Colonel Sowerby, F.H.S.
- Mr. D. Ferguson, at the Botanic Garden, Belfast.
- Mr. G. Fleming, gardener to the Duke of Sutherland, F.H.S.
- Mr. A. Forsyth, gardener to the Earl of Shrewsbury, F.H.S.

Mr. John Green, gardener to Sir E. Antrobus, Bart.. F.H.S.
 Mr. J. Henderson, gardener to Earl Fitzwilliam, F.H.S.
 Mr. Edward Law, gardener to The Lord Wharncliffe.
 Mr. A. Scott, gardener to Sir George Staunton, Bart., F.H.S.
 Mr. John Spencer, gardener to the Marquis of Lansdowne. F.H.S.
 Mr. G. Vinden, gardener to J. D. Llewelyn, Esq.
 Mr. R. Wilson, gardener to the Duke of Norfolk, F.H.S.
 Mr. J. B. Whiting, gardener to H. T. Hope, Esq., F.H.S.
 Mr. J. M'Nab, juu., Experimental Garden, Edinburgh.
 Mr. Robert Reid, gardener to Mrs. Clark, Noblethorpe, Barnsley.

Such are the main points to which the Council deem it necessary to draw the attention of the Society. This Report shows that during the last six years the debt of the Society has been reduced to the extent of 4315*l.*, although in the course of that time has been expended—

For medals and other rewards	£ 5,690
For the expenses of collectors	3,837
For new buildings and other outlays in furtherance of the objects of the Society and in augmentation of its means	5,221
	£ 14,748

ORIGINAL COMMUNICATIONS.

XXIII.—*On the Management of Fruit-Tree Borders.* By
Mr. Robert Reid, C.M.H.S., Gardener to Mrs. Clark of
Noblethorpe, near Barnsley.

(Communicated April 29, 1816.)

PLANTING fruit trees on solid floors of stone or other hard material has been recommended by some of the most eminent horticulturists as a certain method of preventing the roots from penetrating into the subsoil, and keeping them near the surface, whereby they receive all the benefits derivable from the influence of the atmosphere on dressings of manure. But there are other great advantages attending the above methods of planting which have not been pointed out by any writer on gardening, that I am aware of, and which I consider well deserving the attention of the society. The gardens at this place were made entirely new in 1839-40, previous to which time I had not paid much attention to this method of planting, but on consulting a friend * I was induced to adopt it; I accordingly had every tree, both wall and standard, planted on floors of stone, which consisted of thin free-stone flags laid in beds of mortar, and firmly jointed with the same: the floors for the standards were 3 feet square, those for the wall trees were made 6 feet in length, parallel with the wall, and 3 feet in width, from the wall to the border; they were made nearly level, and placed about 1 foot below the surface of the border. When the trees were planted the floors were first covered with about 6 inches of soil, and 8 or 9 inches over the roots, raising little mounds over them to prevent the drought from penetrating too deep during the summer.

On the second summer after being planted the Peach trees grew with great vigour, many of the shoots measuring 4 feet in length and upwards, which induced me to examine the state of their roots in the autumn when they had finished their growth; I found many fine roots which had grown nearly 7 feet from the stem of the tree, and 4 feet beyond the outer edge of the stone floor: on finding them in this prosperous state I had a trench opened opposite every tree, and cut the roots back close to the edge of the floor all round. The following summer the growth was not, of course, so vigorous, but strong enough to produce a sufficient supply of fine bearing wood, likewise ripening a few fruit on each tree perfectly. Last autumn (the fifth season) I

* Mr. Robert Errington.

again examined the roots, when I found them very numerous, and extending to nearly 12 feet distance from the wall, when I again had the border trenched, cutting off every root to within 18 inches of the floor, or 4 and a half feet from the wall. As the trees are still growing rather too strongly for bearing well, they having all reached the top of the wall (12 feet high), I expect this second cutting will not only double the number of roots, but will so regulate the growth of the trees as to bring them into a permanent-bearing state without any check whatever.

It will be obvious, from the above statement, that when fruit trees are planted on stone floors, the roots may be increased in number, and their position ascertained with as much facility and certainty as the branches, and the operation performed without any, or at least with very little check to the growth of the tree, and may be repeated at proper intervals for many years; and this I consider far preferable to taking up the tree bodily for the purpose of pruning its roots, which can only be done once or twice in the first stages of its growth, and which even then will not prevent the roots, in the course of time, from penetrating deep into the subsoil, producing that luxuriant barrenness of which we see so many instances in old gardens.

It is certainly a great satisfaction to know nearly the position of the roots of every fruit tree in a garden, especially when a change of gardeners takes place. The new gardener will at once be able to ascertain their state of health, or if their situations do not please him they can be quickly removed without check or loss of much time, if the roots have been previously attended to in the proper way.

The vine borders here are made on stone floors, extending the whole length and breadth of the borders, the floors sunk only one foot below the surrounding ground; the borders sloping down from about 2 feet in depth next the houses to a few inches at the outside. The vines have been planted five years, and have borne four good crops, and are, to all appearance, likely to continue in the same prosperous state; but should the borders require at any time a renewal it is easily managed with a bottom of this description, as by keeping close to the stone every root may be carefully raised up and preserved, if necessary. I am so thoroughly convinced of the superiority of the above way of planting fruit trees over all others, that I am particularly anxious to direct the attention of the Society to the subject.

XXIV.—On the Treatment of the Genus Amaryllis for Autumnal Blooming. By Mr. John Spencer, C.M.H.S., gardener to the Marquess of Lansdowne, F.H.S., at Bowood.

(Communicated March 16, 1846.)

THE great scarcity of flowers during the months of October, November, and the early part of December, for decorating the conservatory and drawing-room, induced me to try the experiment of so far altering the habit of some of the varieties of the genus Amaryllis, as to enable me to depend on their blooming in those months as strongly and regularly as they usually do in the spring. The success that has attended my practice, and the great acquisition they are at that time for the above purposes, have induced me to lay my method before the council of the Horticultural Society.

Before I explain my own mode of culture, I beg to quote the opinion of the late President of the society on the growth of bulbous plants in general, as it has furnished me with an admirable groundwork for prosecuting the cultivation of this tribe of plants.* “Bulbous roots increase in size, and proceed in acquiring powers to produce blossoms only during the periods in which they have leaves, and in which such leaves are exposed to light; and these organs always operate most efficiently when they are young, and have just attained their full growth.”

Bearing these important facts in mind, we will suppose a moderate collection is already in hand, and the object to be attained is to induce the bulbs to bloom in the autumn months. In the first place they should be potted in December, using pots in proportion to the size of the bulbs. The soil I have found best suited for their growth is composed of two-thirds light turfy loam, and one-third of half rotten leaves and coarse river sand, draining the pots well, and using the compost in as rough a state as possible. If additional stimulus is required, it may be supplied, when the leaves are fully formed, in the shape of manure-water every second or third watering. In potting them, observe to keep two-thirds of the bulb above the earth in the pot: they should now be plunged in a pit or frame near the glass, and where there is a moderate bottom heat to encourage the bulbs to root freely before they commence growing by the leaf; and to accomplish this, the bottom heat should be considerably in advance of the top.

When it is found that the roots have made considerable progress towards filling the pots, they should be removed to a light house, and be placed as near the glass as circumstances will

* Knight in Transactions of Horticultural Society.

admit. The temperature of this house should be kept between 60 and 75 degrees. The increase of both light and heat will cause the bulbs to grow rapidly, and great care should be taken not to injure the foliage; if any blooms appear they must be removed, and water supplied when requisite; by this treatment the plants will in a short time possess a strong and healthy foliage, at which time manure-water may safely be applied with the best effects. Whenever the appearance of the leaves indicates suspension of growth, water should gradually be withheld; but they must still be exposed to the utmost amount of light and heat, until the leaves become of a partially brown or yellow colour, when they may be removed to a dry cool place until wanted for blooming. By the above treatment they will generally be in a perfectly ripened state by the end of April or early in May.

I do not agree with those who advise that, during the period of the plants' rest, they may be shaken completely out of their pots, for I find they bloom much stronger by being allowed to remain in the pots in which they grew. It will be seen that the roots, if taken proper care of, keep fresh and vigorous during their rest, and shaking them out would greatly weaken their after-flowering. It is not material where they are kept during their repose, provided they are kept dry.

Towards the end of August preparations may be made by commencing with all or part of the stock: the pots should be well soaked with water, and then plunged in a mild bottom heat in any pit or frame that may be at work. When the flower stems have advanced 6 or 7 inches in height they may be removed to a stove to open their flowers, and afterwards placed either as ornaments for the conservatory or turned out into vases or ornamental pots for decorating the drawing-room—where the nobleness of their flowers, and elegance of habit, make them suitable decorations. By the above management I have found those varieties enumerated below bloom quite as strong as they usually do in the spring: *Johnsoni*, *Reginæ*, *Vittata*, *Reticulata*, and their allies, frequently have 3 or 4 spikes of bloom, and attain the height of from 3 to 5 feet.

Immediately after they have done blooming they should be partially shaken out, disturbing the roots as little as possible, and repotted as before advised; placing them in a bottom heat until the roots have taken hold of the soil. And then is to be pursued a similar course of treatment, as before recommended.

In conclusion I beg to add, that few flowers will better repay the little extra trouble their successful cultivation requires than the Amaryllis, and that none is susceptible of greater improvement: their cultivation appears to have retrograded of late

years, this genus having, as I think unjustly, been thrown into the shade by more favoured races. Still I hope some spirited cultivator will again bring them into public estimation, and place them in company with other more esteemed species.

List of varieties grown to bloom in the autumn :

<i>Amaryllis Johnsoni</i>	<i>Amaryllis picta</i>
— reginae	— Solandriflora vittata
— reginae	— Sweetii
— reticulata	— marginata conspicua
— vittata	— nobilis
— Acramanni	— marginata venusta
— concinna	— aulica
— grandis	And several other hybrids.
— insignis	

XXV.—*Journal of a Mission to California in search of Plants.* By Mr. Theodore Hartweg, in the service of the Horticultural Society. Part I.

[It has been already stated (p. 169) that in the autumn of last year the Council of the Society decided upon sending Mr. Hartweg out again as a collector. He was instructed to proceed to Vera Cruz, thence to reach the city of Mexico without delay, and afterwards to station himself at Tepic until an opportunity occurred of obtaining a passage to California. In that country he was to spend one or two years, as might appear to himself most advisable. The following is the journal which Mr. Hartweg has kept, in pursuance of his instructions, as far as it has been yet received.]

AFTER a passage of forty-five days in one of the royal mail steam-packets, I arrived in the evening of the 13th of November, 1845, in the roadstead of Vera Cruz, and landed the following morning, when I presented my letters of introduction, and made arrangements with Messrs. Manning, Mackintosh, and Co., with regard to forwarding the collections I might from time to time send to their care.

On the morning of the 15th I left Vera Cruz for the sugar estate of Mirador, where I was welcomed by my old friend, Mr. Sartorius. Mirador is about three miles from Zacuapan, where Mr. Sartorius then resided when I arrived in Mexico in December, 1836; and being situated on the eastern declivity of

Orizaba, commands a fine view of the lowlands of Vera Cruz. Having only a short time to spend here, I made an excursion to the colder district of Orizaba, by passing through a deep ravine to the village of Chichiquila. Here I found a *Magnolia*, forming a large tree with oblong shining leaves, several species of oaks, *Garrya macrophylla*, *Cobaea scandens*, *Lophospermum scandens*, two species of *Viburnum*, a *Cornus*, *Tilia mexicana*, a Juniper forming a small tree, *Pinus Pseudo-strobus*, and *P. Llaveana*, the latter with rather more elongated cones than those found near Zimapán.

On the 29th of November, I arrived at Jalapa, and taking the diligence for Mexico, I arrived in the capital on the 3rd of December. After a stay of two days, during which time I delivered my letters of introduction, I left for the Hacienda de Laureles, near Anganguero, where seven years previously I found *Achimenes patens* and *heterophylla*, the objects of this journey. Notwithstanding I recollect the locality where I saw them in flower in September, 1838, yet I had great difficulty in finding the roots, for not a leaf, however shrivelled up, could be seen. Under these circumstances I consider myself very fortunate in having found roots of some species of *Achimenes*, but whether of *A. patens* or *heterophylla*, or both, I must leave undecided. [It has proved to be *A. patens* only.]

On Saturday the 13th I returned to Mexico; on the 15th I was obliged to be present in clearing my luggage at the custom-house. On the 16th I went in search of *Abies hirtella*, of which Humboldt gives the locality at 'El Guarda,' an insignificant military post on the road to Cuernavaca, at a distance of thirty miles from the capital. El Guarda is situated on a lofty plain; the only silver firs within view are on the mountain half a mile to the south; this is a little wood covering only the north side of the hill, and consists entirely of *Abies religiosa*. From inquiries I made at El Guarda respecting another silver fir growing about there, I could learn nothing satisfactory. From my own experience I am sure that it does not grow, if at all, within six miles of El Guarda.

This excursion, however, has not been fruitless, for I found near Ajusco a Pine I had never seen before, and which I suspect to be Loudon's *Pinus Montezumæ*, it has the same glaucous appearance as *P. Montezumæ* in the Society's Garden, but shorter leaves, smaller and more pointed cones. It forms a tree of about 40 feet high, and from the upright leaves and habit in general, it has much the appearance of *Pinus Pinea*.

On December the 17th I returned to Mexico, and called the following day upon H. B. M.'s Minister, Mr. Bankhead, through whose influence I obtained some letters of introduction

from the Mexican government to the governors of Guadalajara, Mazatlan, and California. Having arranged my affairs with Messrs. Manning and Mackintosh, I took the diligence on the 19th for Guadalajara, where I arrived safely on the 25th, passing over a very uninteresting ground, for not a tree was to be seen save a few stunted *Schinus Molle* and *Opuntias*.

On the 28th the arrangements being completed for pursuing my journey, I left on horseback in company with Mr. K., a young merchant who is proceeding to Mazatlan, and arrived in Tepic on the 1st of January, 1846, after five days' hard riding.

Having been advised by my friends in Mexico, and by Messrs. Barron and Forbes, of Tepic, not to proceed to California without my luggage, I resolved to await it here, and in the meantime examine the neighbourhood.

The town of Tepic is situate in a plain at an elevation of nearly 3000 feet above the level of the sea, and enjoys a temperature of 80° in summer, and 60° to 70° during the winter months. Most tropical fruits and sugar-cane are cultivated here. In the S.W. at a short distance from the town is a range of mountains, of which the highest part is called the Cerro de San Juan. The whole range is of volcanic origin, and is chiefly composed of crumbled pumice-stone, which at a distance gives it a whitish appearance. The principal forest-trees are Pines, one of which closely resembles *P. macrophylla*, with beautiful long foliage and cones varying from 12 to 16 inches in length. This forms a tree from 60 to 80 feet high. Another species of Pine, forming an equally large tree, is called by the natives Ocote hembra (female pine, in opposition to the first, which is named Ocote macho or male pine). The foliage of this new species is 16 inches long, and the cones measure from 4 to 5 inches in length. This is not frequently met with, and the cones are produced more sparingly than in the other kind.

The more elevated parts of the Cerro de San Juan are covered with oaks, an *Arbutus*, a shrubby *Bocconia*, several syn-genesious shrubs, a white flowering *Ceanothus*, *Bouvardia splendens*, and among herbaceous plants I observed *Lobelia laxiflora*, *Spigelia scabriuscula*, with a head of crimson flowers resembling at a distance *Phlox Drummond*, a half shrubby *Pentstemon* with large pink flowers, *Macromeria exserta*, *Aristolochia brevipes*, and the showy *Lamourouxia multifida* and *cordata*.

On January the 8th, passing over the plain of Tepic in an easterly direction, after a ride of six hours I entered the Monte de los Quartos, a forest consisting chiefly of oaks with a few pines intermixed: the only plant in flower was *Lupinus Ehrenbergii*; on the banks and in the dried-up bed of the rivulet that

crosses the mountain, *Littaea geminiflora* with a flower-stem from 12 to 18 feet long, but bent down by the weight of its numerous seedpods, grows abundantly. In the evening I arrived at the village of Ocotello. About noon the following day I reached the hamlet of Auseta, situate at the foot of the volcano Tetitlan. Having with difficulty procured a guide to ascend the mountain, and provided the necessaries, including a calabash with water, we set out and arrived before sunset on the north-western declivity of the volcano, where we encamped for the night in a beautiful pine forest.

At seven o'clock on the 10th, leaving our horses in charge of my servant, I began to ascend with the guide, who, being armed with a machete (a kind of long knife), cleared a path among the brushwood and long grass that encumbered our way. After a continual steep ascent of four hours, through a forest composed chiefly of that long-coned pine found near Tepic, a few oaks, *Mimosas*, a *Laurus*, *Garrya laurifolia*, and a *Fraxinus*, we arrived at the ledge of a black volcanic mass, destitute of all vegetation. No crater is perceptible, but it seems that the torrents of partly calcined lava that descend several miles into the plain below on the north and south side of the mountain, burst forth laterally. The volcano of Tetitlan is about 6000 feet above the level of the sea; centuries must have elapsed since it was in activity; no tradition exists among the population settled at its base when it broke out. Having finished our survey, we returned to our encampment in two hours, and in the evening reached the farm of La Estancia, and returned thence by way of San Pedro to Tepic on the 12th.

Having finished my letters for England by the 16th, I intended to have set out the following day on an expedition to the south; but my plans were frustrated by a heavy fall of rain during the night and following days. Although we are now here in what is termed the dry season, yet occasional showers occur during the months of December and January, which are called by the natives *Aguas nieves*. They are not accompanied by thunder, but continue for several days without intermission.

The weather having at length cleared up by the 20th, I sallied forth on horseback the following day with the servant I had hired for the occasion, and crossed the plain of Tepic in a southerly direction, leaving the Cerro de San Juan on the right. After an easy ride of three hours, we entered a ravine through which a stream that we had to pass several times winds its way. The vegetation here assumes a tropical character, and furnished me a *Cattleya*, *Stanhopea*, *Mormodes*, *Catasetum*, and an *Epidendrum*, none of them however in flower. In the evening we arrived at Compostella, said to be the oldest town in the state of

Jalisco : judging from its dilapidated state, tradition seems to be correct.

On the subsequent day, crossing the plain of the Hacienda de San José del Conde, which affords rich pasture to several hundred head of cattle, we descended to the river of Huitotillan, a mountain stream running in a ravine probably 800 to 1000 feet lower than the level of the plain. The perpendicular sides present no facilities for a road being made there, we therefore had to pass up the ravine, fording the river eight times, which owing to the late rains was nearly impracticable, as the water reached up to our middles. The vegetation, as far as the small village of Matanejo, where we arrived in the evening, affords little interest at this season. The copsewood covering the sides of the ravines is composed of deciduous leafless shrubs, only relieved by a giant *Cereus*, forming a singular tree ; this generally has a single stem 2 to 4 feet high, by 18 inches in diameter, when it divides into numerous triangular branches, rising perpendicularly to the height of 20 to 30 feet. In May it yields a delicious fruit called Pitaya, when it is much sought after by the natives.

Leaving Matanejo early the following morning, we soon entered a forest of oaks ; here I found two species of *Epidendrum*, an *Oncidium*, *Odontoglossum*, and an *Epiphyllum*, the latter, like *E. Ackermannii*, inhabiting trees. Although I have not seen it in flower, yet judging from its broad deeply-cut leaves, or rather stems, it will prove a valuable acquisition to that interesting tribe of plants.

The timber of the oak does not bear a high character as to durability ; when exposed to the weather it soon rots, and the trees, healthy however they appear to be, are generally hollow in the centre.

Not seeing any prospect of finding anything to warrant my proceeding further in this direction, I returned to Tepic on the 25th. The following day the Aguas nieves set in again, and continued up to the 29th with scarcely any interruption. Having made some excursions in the immediate vicinity of Tepic when the weather permitted it, but without finding anything worth noticing, I set out again on the 7th of February for San Blas. Descending by the road usually travelled during the dry season, we arrived in the evening at the farm of La Manuela, situate in a wood of *Acacias*, *Prosopis*, *Laurus*, Palms, Cedar, the Lemon, a species of *Citrus*, and several species of *Ficus*, among which there is one sending forth roots which descend into the earth, giving support and nourishment to the numerous far-spreading branches, or sometimes encircling a palm with its stem, thus presenting the singular deception of palm-leaves

growing out of the fig-tree. As may be supposed, the embrace in time proves fatal to the palm. A species of *Annona* also occurs here spontaneously, producing a fruit which in size and shape resembles the Cherimoyer, but bears no comparison with the latter as to quality. I often saw it cultivated in the warmer parts of Mexico, requiring a higher temperature than the Cherimoyer. It is, I believe, *Annona lavigata* (?) ; the native name is *Anona*.

From La Manuela to San Blas, where we arrived the following day, the country is perfectly level, subject to inundations from the Rio Grande de Santiago, which empties itself by many outlets into the sea a few leagues above San Blas. One of these inundations happened a few days before, and left us to traverse a space of five leagues knee-deep in mud.

After a stroll upon the beach and amongst the salt marshes, covered with Rhizophoras, which surround the town, I soon convinced myself that I need not look for any novelties there.

Being detained on the 8th by the incessant rain, I returned to Tepic on the following day by the "Canino de aguas;" this road is considerably shorter than the one I came, and from its rocky nature is passable at all times, whilst the road by La Manuela is several feet under water during the rainy season.

The following observations of the amount of rain fallen in Tepic from June, 1845, to March, 1846, were made by Mr. Alexander Forbes, and have been kindly given me by that gentleman :—

			Inches.
1845.	June	.	6·5
	July	.	12·8
	August	.	9·5
	September	.	11·6
	October	.	1·6
	November	.	5·
	December	.	1·
1846.	January	.	3·8
	February	.	2·3
			<hr/>
	Total		48·1

This amount of 48·1 inches fallen during nine months is, however, above the average in ordinary seasons. The periodical rains set in about the middle of June, and terminate by the end of September ; the rest of the year is usually dry.

(*Tb be continued.*)

XXVI.—*The late Mild Winter.* An Extract from a Letter to the Vice-Secretary. By John Williams, Esq., C.M.H.S., of Pitmaston, near Worcester.

(Dated January 20, 1846.)

MANY of my neighbours, knowing that I have kept a Meteorological Journal for many years past, have questioned me if I ever remembered so mild a winter as the present has been down to this time? My answer was, that I have recorded several mild winters, from October down to March and April, when we have experienced several sharp frosty mornings or cold dry north-easterly winds. I commenced my weather-journal in 1808, and have continued to make daily observations down to the present time, not merely a daily registration of the thermometer, barometer, wind, and degree of cloudiness or sun, dryness or moisture; and for eleven years of the period kept a rain-gauge; also occasional observations on the atmospherical electricity, and a record of all the storms in England, the neighbouring continent, and every part of the world, collected from newspapers, &c., and entered in the margin of my journal of corresponding dates; also a Calendar of Flora, stating the day the blossoms of fruit-trees first opened, on different aspects, on walls or standards; appearances of agricultural crops, and the expectant observations of practical farmers, as well as my own. When I explained all this to Sir David Brewster (then Dr. Brewster), with whom I had some correspondence about ten years ago, and made, for about three years, at his request an hourly observation on the 17th of July, for twenty-four hours, of the barometer and thermometer, but was obliged to give it up as my health suffered from exposure to night air, speaking of my journal, Dr. Brewster expressed a hope that I would not destroy it, as in his opinion it would be a valuable record, deserving of preservation.

The season that has prevailed from the beginning of October last down to this day has been almost the same as in the years 1821-22; that is, from the 1st of October, 1821, to the end of May, 1822. It then commenced with much blowing weather from south-westerly points, going round occasionally to the north-west, and sometimes, for twelve or twenty-four hours, to the north or north-east; and on a few calm, bright nights the radiated surface-warmth reduced the temperature of the soil and leaves of plants sufficient to produce hoar-frost on grass in low situations; and, once or twice, the thermometer, at 8 A.M., in January, was at 28° ; but the average maximum of the month of January this year exceeds that of January, 1822. Scarlet geraniums, however, in 1821-22, stood all the winter uninjured

on the west side of my house, and also in the garden of a neighbour.

Kirwan, who wrote on the climate of England and Ireland about sixty years ago, said the Atlantic Ocean was the great arbiter of our seasons. He considered that the Atlantic Ocean retained five degrees of the warmth given by the Gulf stream by the time it arrived on the western coasts of Ireland, England, and Scotland; and I fully believe the truth of this observation. Yet it is a most extraordinary thing that almost a century past, when thousands of individuals have kept most accurate weather-journals, I have never met with one recording the temperature of the ocean, at the surface, surrounding Great Britain and Ireland at full tide, in the open sea (not the estuary of a great river). I made a request to the Royal Society to do this some years ago; the answer was, that the Admiralty was the party to apply to. I did write to the Lords of the Admiralty before the ships were sent some years ago in search of a north-west passage into the Pacific Ocean; I requested the temperature of the sea at the surface might be recorded; this was done, but as the ships were continually varying their latitude, the record was of no use to give the information I have so long sought. An accurate observation in the German Ocean, made off the coast of Yorkshire, or a few miles eastward of the Frith of Forth, another at Spithead, Penzance, off Cork, and Isle of Man, in January, February, March, or April, last year and again this year, I feel certain would have given many degrees of temperature higher this winter than last year, 1844-45. The mild winter I have alluded to, of 1821-22, went on without frost or any check from cold winds through the months of February, March, April, and May. The whole month of June was the warmest I ever remember; July also was warm till the 19th. But continual rains then set in at the time of corn harvest, and in August the wheat in Worcester was all spoiled. There were good crops of apples and pears. If I am right in my conjecture, that after a blowing winter, and frequent south-westerly or westerly winds, we have a larger body of warm equatorial water drifted to the north-west of Europe, we shall then find the north-east winds, should they set in in March and April, prove much less cold than last year, when the German Ocean was so much cooled by the melting ice from the Baltic, the German rivers, coast of Norway, &c. There was no ice or snow in the western parts of Russia in 1821-22, and the mildness extended far eastward, where it appears the air got cooled in the northern regions and returned in a cold current through Greece, Turkey, and the countries to the eastward. Rome also was very cold, and North America. It is an old observation, that when the winter in North America is severe,

we in the west of Europe have a mild season, and *vice versa*. One remarkable circumstance happened in 1821-22: the great volcano on Mount Hecla (Iceland) broke out in December, 1821, as did Vesuvius a short time after. Mount Hecla also broke out into active eruption on the second of *September last*, as noticed in my register; and again I have recorded, from the Copenhagen papers of the 22nd of December last, an account stating, "that Mount Hecla, after a few weeks following the eruption of the 2nd of September, had ceased, but that a more violent eruption had lately (Copenhagen, 22nd December) happened, with a vast discharge of red-hot liquid lava, which had overrun an extensive surface."

Soon after the turn of Christmas last I attended a public meeting at Worcester, to enter into a subscription for food and coal for the poor of the city and suburbs. I remarked to those who sat near me, that I expected a mild winter, and was asked why I thought so: my reply was, the late prevalence of south-westerly and westerly winds during October, November, and December, and the consequent warmth of the Atlantic Ocean.

XXVII.—*An Account of an American Mode of Propagating Dwarf Pear-Trees.* In a letter to N. Longworth, Esq., President of the Cincinnati Horticultural Society. By W. Smith, M.D.

(Communicated by the Cincinnati Society, June, 1845.)

In October, 1842, I had a number of quince-bushes dug up and put in trenches in a horizontal position, all the branches were placed a few inches under ground, the young shoots only being left above; these grew very freely in the spring and summer of 1843, and were budded in July and August; two or more buds were placed on each, according to the length, a few inches apart. In the spring of 1844, when the pear-buds began to shoot, the young branches in which they were inserted were pegged to the surface of the ground, and as soon as the pears attained the height of three or four inches these branches were covered with earth, and in the end of October were rooted along their whole length, affording a sufficient supply for the separate growth of each, and at this time a number were planted out (these are now fine growing trees). In 1843-44, the branches of the buried bushes sent up innumerable healthy shoots; in May we began budding these, and continued to bud every favourable day when sap flowed freely in June, July, August, and September. In April, 1844, all were again pegged to the

ground, and in like manner covered with earth, the young pear being left out. There is now a fair prospect of an abundant supply of young trees, many of which, I have reason to think, will bear the second or third year from the time they are planted out. The small piece of ground in which I am trying this plan of nursery is a perfect thicket of young trees. It is evident that this will be a permanent mode of procuring them, as there will be a continued supply of stocks.

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XXVIII.—*A further Account of Weigela Rosea.* By Mr. Fortune and the Vice-Secretary. With a coloured plate.

WHEN I first discovered this beautiful plant* it was growing in a Mandarin's garden on the Island of Chusan, and literally loaded with its fine rose-coloured flowers, which hung in graceful bunches from the axils of the leaves and the ends of the branches. The garden, which was an excellent specimen of the peculiar style so much admired by the Chinese in the north, was often visited by the officers of the regiments who were quartered at Tinghae, and was generally called the Grotto, on account of the pretty rock-work with which it was ornamented. Every one saw and admired the beautiful Weigela, which was also a great favourite with the old gentleman to whom the place belonged. I immediately marked it as one of the finest plants of Northern China, and determined to send plants of it home in every ship until I should hear of its safe arrival.

All the gardens of the Mandarins in the north of China are small, and as there is only room for a few plants, these are always of the most select and handsome description. Amongst my collections are several other plants which are common in these gardens, all of which are of great beauty and interest. Azaleas, Roses, Moutans, Glycine sinensis alba, Viburnums (more handsome than our common Gueldres rose), and various other free-flowering shrubs, make these gardens extremely gay, particularly during the spring and early summer months.

Weigela rosea is unknown in the southern provinces of China, and therefore I have every reason to suppose that it will prove hardy, or nearly so, in England; but, if not, it will make a first-rate greenhouse plant, and will take its place by the side of the beautiful Azaleas and Camellias of its own country. I never met with it in a wild state on the Chinese hills, and it is therefore just possible that it may have been originally introduced to China from Japan: this, however, is only conjecture.

* See page 65.

In the north of China, where the plant is found, the thermometer sometimes sinks within a few degrees of zero, and the country is frequently covered with snow, and yet in these circumstances it sustains no injury.

As this shrub has been liberally distributed amongst the Fellows of the Horticultural Society, some remarks upon its habits and cultivation will probably be acceptable. It forms a neat, middle-sized bush, not unlike a *Philadelphus* in habit, deciduous in winter, and flowers in the months of April and May. One great recommendation to it is that it is a plant of the easiest cultivation. Cuttings strike readily any time during the spring or summer months, with ordinary attention; and the plant itself grows well in any common garden-soil. It should be grown in this country as it is in China, not tied up in that formal unnatural way in which we frequently see plants which are brought to our exhibitions, but a main stem or two chosen for leaders, which in their turn throw out branches from their sides, and then, when the plant comes into bloom, the branches, which are loaded with beautiful flowers, hang down in graceful and natural festoons. It was a plant of this kind which I have already noticed as growing in the grotto-garden on the Island of Chusan; and I doubt not that plants of equal beauty will soon be produced in our gardens in England.

The possessors of *Weigela rosea* had better give it some slight protection during the next winter, by keeping it either in a greenhouse or frame until duplicates are made, when these can be planted out in the open air. The main object should be to enable the plant to ripen its wood well, for when this is done it will not only be more hardy, but it will also flower better in the following season.

Its capability of standing out our English winters will be shown in the Garden of the Horticultural Society next winter; but whether it prove itself a hardy or a greenhouse plant, it is without doubt one of the finest shrubs which have been introduced to this country of late years.

ROBERT FORTUNE.

An opportunity has occurred of comparing fresh specimens of both *Weigela* and *Diervilla*; and the result of that comparison confirms the propriety of regarding them as distinct genera. Both are remarkable among Caprifoliaceae for their one-celled ovary, cut into four false cells by the projection of a pair of double placentæ which do not unite in their axis (fig. 2), and both have a double capitate stigma (fig. 3) and a remarkable epigynous gland (fig. 1 a). But while in *Weigela* that gland is

free, it, in Diervilla, adheres to the corolla ; and in Diervilla the corolla is irregular and gibbous on one side at the base, while in Weigela it is regular and equal-sided at the base.

JOHN LINDLEY.

XXIX.—*Contributions to a History of the Relation between Climate and Vegetation in various parts of the Globe.*

No. 1.—*The Vegetation of Rio Janeiro.* By George Gardner, Esq., F.L.S., Director of the Royal Botanic Garden, Ceylon.

THERE is perhaps, no part of the world where, in an equal extent of country, a greater variety of vegetable forms are to be met with than in the province of Rio de Janeiro ; and it is quite certain that none of the other Brazilian provinces can be at all compared with it. Situated on the verge of the Southern Tropic, and consisting principally of deep valleys and high mountain ranges, some of which reach to an elevation of nearly 7000 feet above the level of the sea, it necessarily presents a variety of soils and situations favourable to different races of plants, and possesses the two great requisites indispensable for their growth—heat and moisture. The neighbourhood of Rio itself has been oftener visited by botanists than any other part of the empire ; but its botanical riches are even now far from being exhausted. The first five months of my residence in the country were devoted to the investigation of this district, and having worked up my collections since my return to England, I found them to contain about 20 per cent. of new species ; but as an eternal spring and summer reign in this happy climate, and as every plant has its own season for the production of its flowers, every month is characterised by a different flora ; and it can scarcely be expected that the whole of its treasures should be made known for a long time to come.

The country round Rio is essentially granitic ; and the soil, which is highly argillaceous, has been principally formed by the decomposition of such rocks. It is of a red colour, very tenacious when wet, and is often from 30 to 40 feet in thickness. It is only in the valleys that an alluvial soil covers this to any depth ; for on the mountain declivities it is seldom more than half a foot in thickness. This is no doubt caused by the heavy rains washing it, as well as the materials of which it is formed, down into the valleys. The rainy season sets in about October, and lasts till April or May ; but from the vicinity of the mountains, and of the vast forests by which they are covered, showers fall nearly all the year round. It has been remarked, however,

within the last twenty years, that the rains have been much less since the country near the city has been so much cleared as it now is of the forests by which it was once covered.

During the first few weeks, my walks were confined to the shores, the valleys, and the low wooded hills in the vicinity of the city. On the shores I found the vegetation to vary, as might be expected, according to the nature of the soil, which, when it is muddy, produces thick plantations of *Rhizophora Mangle*, *Aricennia tomentosa*, and *Laguncularia racemosa*, growing quite into the sea. There also, but on the more elevated parts, the Cashew-nut tree is found. Where the shore is formed of loose white sand, it is covered with large patches of *Ipomaea Pes Caprae*: the long-rooting shoots bind together the soil much in the same way as those of *Elymus arenarius* and other creeping grasses do that of the shores of Europe. Here also are found *Remirea maritima*, *Polygala Cyparissias*, and the glaucous-leaved *Acicarpha spathulata*, which throws out its spreading branches; while amid these, and growing almost into the sea, there is great abundance of *Sophora tomentosa*, a shrub which varies from two feet to ten feet in height, and which, during the flowering season, is covered with large racemes of yellow blossoms, not unlike those of the laburnum. This plant has been published by Schrader, and taken up by De Candolle, in his 'Prodromus,' as a new species, under the name of *Sophora littoralis*; but it is certainly not distinct from the old *S. tomentosa* of Linnæus. I have found it all along the coast of Brazil, from Rio to the Equator. Intermingled with the *Sophora* grows the Pitanga (*Eugenia Michelii*, Lam.), a gay myrtle-like shrub, which has a fine appearance, either when covered with its numerous white blossoms, or when loaded with its scarlet fruit, about the size of cherries. Twining among the branches of these and other shrubs along the shore, I found beautiful specimens of *Aristolochia macrura*, and *A. rumicifolia*. These sandy shores also abound with *Opuntia brasiliensis*, often covered with a cochineal insect; and *Myrrhinium atropurpureum*, an anomalous species of Myrtaceæ.

Where the shores are rocky the vegetable forms again differ. The peculiarities of such places may be well remarked upon a small promontory called the Morro-do-Flamingo, that juts into the bay about two miles south of Rio. It rises about 150 feet above the level of the sea, and is partly cultivated, and partly clothed with its natural vegetation, which exhibits itself in the shape of large shrubs and herbaceous plants, reaching to the very edge of the sea. On the rocky parts, which are apparently destitute of soil, several angular Cacti spread out their grotesque limbs; and on its nearly perpendicular face, great quantities of a

large species of *Tillandsia*, *Lycopodium rupestre*, *Anemia flexuosa*, *Pteris palmata*, *Trylepsis Lhotskyana*, and *Brassavola tuberculata*, have taken up their abode. Where a little vegetable mould has accumulated, *Prescottia plantaginea*, *Gesnera aggregata*, *Epidendrum ellipticum*, *Vanilla planifolia*, the lovely *Vellozia candida*, and its smaller, though not less beautiful congener, *Barbacenia purpurea*, vegetate and bloom in the utmost luxuriance. Of the many species of *Vellozia* that exist in Brazil, this is the only one found on the coast; the others for the most part inhabiting the mountains in the interior. It often forms a bush from four feet to six feet high, and is a most beautiful object when covered with its large white flowers, which very much resemble those of *Lilium candidum*. It has often been tried to be taken to England alive, but without success. Plants of it, however, which were raised from seed sent home by me, exist both at Glasgow and Dublin, and may soon be expected to flower. Mr. Murray, of Glasgow, has also raised many of the beautiful purple-flowered species from seeds which I sent to him from the gold and diamond districts; but it seems to be a genus very impatient of cultivation. Where the soil is deeper, there a natural shrubbery exists, consisting of several sorts of *Pleroma* and other *Melastoms*, *Myrtles*, *Lantanias*, *Crotos*, *Bignoniias*, *Jacarandas*, *Oxalis Barrelieri*, *Clusia alba*, and herbaceous Composite flowers. Rising above these again are a few small trees of a spiny species of *Bombax*, *Lecythis*, and *Cleome dendroides*, with large racemes of dark purple flowers. In similar situations, *Cattleya Forbesii* is found abundantly, either on the ground or on the branches of the trees, even those which overhang the sea. Here, also, are found some beautiful species of *Almeidea*, two or three species of *Capparis*, *Alsodeia physiphora*, a large shrub belonging to the Order of Violets, with panicles of small white flowers, some beautiful climbers belonging to the Order of Malpighiaceous, several species of *Laurus*, *Cordia*, *Croton*, *Acacia*, and *Mimosa*.

As in other countries, many curious plants are here found in waste places, and by the roadsides, and the stranger from Europe is not a little surprised to find that not a few of these are such as are commonly cultivated in the hot-houses of his native country. Among these I may mention several fruticose Mallow-worts, *Asclepias curassavica*, *Leonotis nepetaefolia*, *Loasa parviflora*, *Buddleia brasiliensis*, *Kalanchoe brasiliensis*, several *Begonias* and *Cleomes*, *Scoparia dulcis*, *Turnera cuneifolia*, *Stellaria media*, *Sonchus oleraceus*, and several grasses and ferns; while, where there is moisture, the beautiful *Dichorizandra thrysiflora* throws up its thyrsse of azure flowers, and various *Jussiaeas* and *Melastoms* may be seen unfolding their yellow and

purple blossoms. The hedges by the roadsides—which are mostly formed of *Acacias*, *Mimosas*, *Opuntias*, *Pereskias*, and not unfrequently of *Limes*—are festooned with innumerable climbers, the many-tinted blossoms of which, while they gratify the sight, equally regale the sense of smell by the delicious odours they exhale. They chiefly consist of various species of *Convolvulus* and *Ipomoea*, *Rubus urticifolius*, *Dalechampia*, *Mikania*, *Aristolochia*, *Paulinia*, *Bignonia*, *Passiflora*, and species of *Cucurbits*. It must, however, be observed that all these do not flower at once, but present a continual succession of bloom.

My first visit to the virgin forests, which cover the mountains, was made along the great aqueduct by which water is conveyed to the city, and which is several miles in length. It winds round from behind the mountain called the Corcovado, which rises to the height of about 2000 feet above the level of the sea. From this excursion I returned loaded with the novelties which it produced. The ascent was made from the Larangeiras valley, at the foot of which there grow some fine large trees of a thorny-stemmed silk-cotton-tree (*Bombax*). By the side of the aqueduct, on its lower levels, there exists a fine variety of flowering shrubs, consisting of *Amphirox longifolia* and *Alsodea paniculata*, both belonging to the Order of Violets; *Metternichia Principis*, the beautiful *Stiftia chrysantha*, the odoriferous *Sinmaba glandulifera*, *Pleroma Fontanesianum*, and several other species of the same genus—*Solanum argenteum*, *Lacistema pubescens*, &c. At a greater elevation, in shady valleys, and in ravines by the side of little streams, many curious little shrubs and herbaceous plants presented themselves. On the banks of one little stream I found two varieties of *Dorstenia ceratosanthes*, one of them with entire leaves, resembling those of *D. asarifolia*; and in dried parts of the same wood a new caulescent species (*D. hispida*, Hook.). It was near this spot also that I first saw a Tree-Fern: it was the elegant *Trichopteris excelsa*, which grows both abundantly and luxuriantly beneath the shade of the lofty trees in the dense forest; but it does not reach to a great height, its stem seldom rising above twelve feet. Under its shade grew many kinds of herbaceous ferns, the most elegant of which, as well as the most common, was *Didymochlaena sinuosa*. In his work on the Cryptogamia of Brazil, Martius represents this as a tall Tree-Fern, but in the different parts of Brazil where I have observed it, I have never seen it with a stem more than $1\frac{1}{2}$ foot in height. The forest here exhibited all the characteristics of tropical vegetation. The rich black soil which has been forming for centuries in the hollows, from the decay of leaves, &c., is covered with, besides the plants already mentioned,

various species of *Begonia*, *Heliconia*, *Tradescantia*, numerous small shrubs, such as *Beslerias*, *Psychotrias*, &c.; while above these again were the graceful Tree-ferns, and the noble Palms, their large fronds trembling with the slightest breeze. But it is the largest of the forest-trees themselves which produce the strongest impression on the mind of the native of the old world. Their thickness, and the height to which they rear their unbranched stems, first claim his attention; then, in place of the few Mosses and Lichens that cover the trunks and boughs of the trees of his own country, here they are bearded, from their roots to the tips of the smallest branches, with *Ferns*, *Arads*, *Tillandsias*, *Cacti*, *Orchids*, *Gesnerworts*, and many other epiphytal plants. Besides these, the trunks of many are encircled with the twining stems of climbing *Bignoniias*, and other plants of similar habit, the branches of which often become so thick, and compress the tree so much, that it perishes from the too close embrace. These climbers again, which merely ascend the trunk, supporting themselves by their numerous small roots, often become detached after reaching the boughs; and the whole mass then presents the appearance of a ship's mast, supported by its stays. These rope-like twiners and creeping shrubs, passing from tree to tree, descending from the branches to the ground, and ascending again to other boughs, intermingle themselves in a thousand ways, and render a passage through some parts of the woods both difficult and annoying. After reaching the highest level of the aqueduct, a good path leads along it for upwards of two miles, and here a different kind of vegetation presents itself. In damp shady places grew the common watercress, and on the rocks, *Marchantia polymorpha*, *Funaria hygrometrica*, *Polytrichum juniperinum*, and *Anthoceros punctata*, which, being all old acquaintances, recalled many pleasing recollections of home. Along with these were associated many other fine species of Mosses, and some delicate Ferns. Numerous species of *Begonia* grew on the faces of the moist rocks, particularly where they were overshadowed by the large trees of the forest. One species (*B. longipes*), bearing large panicles of white flowers, and leaves as large as those of *Petasites vulgaris*, threw up its stem to the height of 10 or 12 feet, among a vast quantity of the large and beautiful *Heliconia brasiliensis*. *Begonia argyrostigma* and *B. sanguinea* were very abundant. On dry rocks, in the woods here, I first met with the beautiful *Epiphyllum truncatum*, growing along with the no less beautiful *Nematanthus longipes*.

The Corcovado Mountain rises to a considerable height above the highest level of the aqueduct. The ascent is from the north-west side, that which looks towards the sea being nearly one per-

pendicular precipice. On the early part of the ascent some of the forest trees are large, and reach to a great height. The underwood consists of small *Palms*, *Melastoms*, *Myrtles*, Tree-Ferns, *Crotons*, *Rubiaceæ*, &c. The herbaceous part of the vegetation is made up of *Ferns*, *Dorstenias*, *Heliconias*, and in the more open places, of a few large *Grasses*. Towards the summit the trees became finer, and of a more stunted growth; and shrubs, especially of the genus *Croton*, are abundant, intermingled in profusion with a small kind of *Bamboo*, and large herbaceous *Grasses*. Two shrubs principally occupy the top—a species of *Pleroma*, and *Franciscea ramosissima*. In the clefts of the rocks grew a few small orchidaceous plants, and *Gesnera tuberosa*, which was very common. It was here also that I first met with the beautiful *Dipladenia crassinoda*. The bare top of the mountain itself, which consists of granite of a very coarse structure, is in many places covered with small Lichens, while in shaded spots I observed some patches of *Polytrichum juniperinum*. The top of another mountain of nearly the same altitude, called the Pedra Bonita, about 15 miles distant from Rio, I found to bear a somewhat different vegetation. On the edge of a precipice, on the eastern side of this mountain, I first met with the beautiful *Cattleya labiatu*, which with some difficulty, and no small risk of falling over, I managed to reach, and obtained both flowering specimens and good plants. A great part of the top was covered with *Vellozia candida*, on the branches of which grew two species of *Epidendrum*. Along with the *Vellozia* grew large patches of *Zygopetalum Mackaïi*, and two beautiful subscandent species of *Dipladenia*, one (*D. violacea*) with large dark violet-coloured flowers, the other (*D. crassinoda*) with large white flowers. They have both tuberous roots, and the flowers of both exhale an odour similar to that of the common Primrose. Both species have since been introduced to England. In a marshy spot grew a fine *Utricularia* (*U. longifolia*, Gardn.), with racemes of large purple blossoms, and spatulate leaves about a foot long. The bare dry parts of the rocky summit are covered with one of the most beautiful of all Lichens (*Cladonia perfilata*, Hook.). It is always a difficult thing to ascertain what the large trees in tropical forests are, as it is with difficulty that their flowers are obtained. Those on the mountains near Rio are made up principally of different species of *Ficus*, *Bombax*, *Myrtles*, *Melastoms*, *Cassia*, *Lecythis*, *Bignonia*, *Swartzia*, *Myristica*, &c.

The Gavea is another mountain nearly of the same height as the Corcovado, but much barer of vegetation. It stands between the sea and the Pedra Bonita, and indeed its base is nearly washed by the waves. In bushy places by the side of the sea, at

this place, a new species of *Tropaeolum* (*T. orthoceros*, Gardn.) grows very abundantly. It is somewhat similar to *T. aduncum*, the principal difference being its straight spur. Here also the lovely *Gloxinia speciosa* is to be met with in the greatest profusion in clefts of the rocks, where a little soil has accumulated. *G. caulescens* is certainly nothing more than a variety of the former in a more luxuriant state: at this place, as also in the valley of Rio Comprido, where I first met with them, they both grew abundantly together. This mountain also presents a precipitous face to the sea, and in the expectation of finding some orchidaceous plants on it, I paid it a visit. In the belt of native wood, which exists between the sea and the base of the perpendicular face, I met with *Dichorizandra thyrsiflora*, and several fine Ferns, different from any I had elsewhere seen. On reaching the face of the mountain, I found its lower part covered with various species of *Bromelia*, *Tillandsia*, *Begonia*, *Gesnera*, and *Cactus*, with other plants which affect such situations. At an elevation of several hundred feet I observed patches of a beautiful orchidaceous plant in full blossom, which I have no doubt was *Cattleya labiata*. There this lovely flower still continues to vegetate, and will do so for generations to come, far from the reach of the greedy collector. In bushy places here, I first met with *Alstroemeria salsilloides*, Mart., a large climbing species, bearing a very large umbel of red and green flowers.

An excursion to Jurujuba Bay, a little inlet on the opposite side of the bay from Rio de Janeiro, was productive of many interesting species of plants. It was there on dry bushy hills that I first saw, in a wild state, the really beautiful *Bougainvillea spectabilis*. In some places it grew very abundantly, and as it climbs up into the tops of the trees, near which it grows, the brilliant colour of the flowers renders it conspicuous in the woods at a great distance. Of this plant I observed three well-marked varieties,—one with flowers of a very pale pink colour, a second has them of a dark crimson, and the third of a bright scarlet colour. But the most interesting of all the plants that I have met with, especially to the botanist, was a species of St. Hilaire's new genus *Affonsia*. It belongs to the Leguminous Order, and its nearest affinity is with *Inga*; but what is very remarkable, every flower contains five distinct carpels. In the midst of a coffee field situated beyond the hills of Jurujuba, I obtained fine specimens of a species of the beautiful genus *Petrea*. It was twining round the stem and up into the branches of a large tree, which had been spared from the destruction of the virgin forest of which it had formerly constituted part. *Lafoënia brasiliensis* was another of my acquisitions. It grew in great plenty in a marsh along with *Typha angustifolia*, form-

ing a handsome shrub about 12 feet high, which, when covered with its large white blossoms, has a striking appearance.

Before quitting the subject of Rio de Janeiro, I shall briefly notice one or two plants which still remain to be introduced to this country, but which would be highly ornamental to our hot-houses.

1. *Stiftia chrysantha*, Mik.—This is one of the most beautiful shrubs indigenous to Brazil. It is not uncommon by the aqueduct, about halfway up the Corcovado; but from experiments which have been made by Mr. Riedel, it seldom succeeds when transplanted, nor does it often perfect seeds. It is a shrub from 8 to 14 feet high, elegant in habit, and with dark-green leaves, not unlike those of the Orange. It belongs to the Composite Order, and to the Mutisiaceous division of it. The flowers are very large, and of a beautiful orange colour, which, when seen from a distance, gives the plant all the appearance of an Orange-tree loaded with fruit. It seems to prefer a dry ar-gillaceo-ferruginous soil.

2. *Metternichia Principis*, Mik.—This is also a shrub, but smaller than the preceding, and grows in similar situations. It produces an abundance of pure white flowers about two inches long, not unlike those of a *Datura*.

3. *Simaba glandulifera*, Gardn.—A shrub with a simple stem from 6 to 10 feet high, and a cluster of spreading pinnated leaves from 2 to 3 feet long at the top, which gives it somewhat the appearance of a Palm. Out of the centre of these proceeds an immense panicle, sometimes 3 feet long, of yellow, highly odorous flowers.

4. *Amphirox longifolia*, Spreng.—This is one of the many violaceous shrubby plants which exist in Brazil. It is rather rare in the woods of the Coreovado, grows to the height of 8 to 12 feet, and produces large panicles of pure white, violet-shaped, sweet-smelling flowers.

5. *Diclidanthera laurifolia*, Mart.—A large climbing shrub which diffuses its branches among those of the trees near which it grows. It belongs to the Order of Sapotads, produces abundance of small yellowish-coloured flowers, and a black eatable fruit, of the size of a cherry.

6. *Myrrhinium atropurpureum*, Schott.—A myrtaceous shrub, from 4 to 6 feet high, not uncommon on the sandy shores of Rio. Its flowers, which are of a dark purple colour, are produced from the older branches, and are remarkable, in the Order to which they belong, for their long exserted and definite stamens.

XXX.—A brief Account of the Naras Fruit, and of the attempts that have been made to cultivate it. By the Vice-Secretary.

WHEN Captain Sir James Alexander visited the country near Walwich Bay, on the south-west coast of Africa, he found in that excessively dry, hot, and barren region, a fruit called the Naras, of which he speaks thus:—"I wandered about the broad bed of the river for an hour or two, looking earnestly into every patch of reeds or long grass for moisture, and digging with our hands in the clay and sand at the most likely places for finding this indispensable element; but no water could we find. With our mouths as dry as a dusty road, and hardly able to speak, we looked about for some green grass to chew, and to our most agreeable surprise we found the new fruit Naras, of which I had first heard from the Boschmen of Ababies."

"The Naras was growing on little knolls of sand; the bushes were about 4 or 5 feet high, without leaves, and with opposite thorns on the light and dark-green striped branches. The fruit has a coriaceous rind, rough with prickles, is twice the size of an orange, or 15 or 18 inches in circumference, and inside it resembles a melon, as to seed and pulp. I seized a half ripe one and sucked it eagerly for the moisture it contained; but it burned my tongue and palate exceedingly, which does not happen when this most valuable fruit is ripe; it has then a luscious sub-acid taste."—*Alexander's Expedition of Discovery*, vol. ii., p. 68. A rude figure of the plant accompanies this account (p. 52), and Sir James Alexander adds, that the thermometer stood at 90° in the shade.

On his return from his expedition, Captain Alexander gave me some seeds of this Naras, which were sown in the garden of the Horticultural Society and presented to several of the Fellows. They were in appearance entirely those of a gourd; they germinated readily, and produced a stiff, spiny, angular-stemmed shrub, which, after growing for a few weeks with all the appearance of rude health, suddenly became sickly and died—not only in the Society's Garden, but with every one else who attempted to cultivate it. In these attempts moisture and heat, and dryness and heat, were tried and varied, all with uniform bad success.

The loss was so total, and so little was seen of the plant, that it had become almost forgotten, when a fresh supply of seeds was received from John Turner, Esq., of 73 A, Theobald's Road, London, who, in reply to the inquiries that were addressed to him, favoured the Society with the following memorandum:—

"In reply to your inquiry respecting the climate of Walwich Bay, I can give you very little information; my stay at the Bay

was too short (only two or three days) to enable me to collect many particulars. In my journal I find no allusion to rain; but as far as my recollection serves me, I believe, from conversations I had with the English residents, that they have no regular periodical rains, and that indeed rain rarely or never falls. They have, however, heavy dews nightly all the year round, and water 5 or 6 feet below the surface in most parts of the valley. This water is somewhat brackish.

"The valley is of limited extent, and is merely the channel of the river Kousip, a river which flows only once in five years, so the natives say: in the intervals between the floods water can only be obtained by digging for it. The channel is bounded by hills of loose sand, utterly destitute of vegetation; and these hills extend north and south along the coast for hundreds of miles. I sailed along the coast from Angra Pequena to Great Fish Bay, a distance of 700 miles; and although I landed at many places, the Naras of Walwich Bay was the only edible vegetable I met with. In such a locality it is invaluable; without it the natives could not remain near the coast. I planted some seeds at Great Fish Bay, but I doubt if the locality is suitable.

"I think that infinite service might be conferred on the natives and settlers in Australia, by the introduction of the plant into the interior of that country, the peculiarities of the soil and climate being so similar to that of Walwich Bay. It would also be a great boon to the natives of the interior of the Cape, and would no doubt thrive on the banks of the Orange River.

"Any quantity of the seed might be obtained by applying to the trading settlers, Messrs. Lawton and Dixon, of Walwich Bay, who have regular communication with their agents at St. Helena."

These seeds have again been raised in the garden, where Mr. Donald, the temporary Superintendent of the Hothouse department, has treated them in the following manner:—

The seeds were sown in dry sandy loam, in a pit supplied with bottom heat; some in a pot, others in soil spread over the bottom of the pit. Those in the pot did not germinate, but those in the soil on the bottom of the pit were all above ground in five days, under a temperature of 80°, with a little air but no shading. To supply moisture a pan full of water was placed beside the plants, seven in number. For about a week they appeared very healthy, then they began to lose their green colour, and to die off one by one without producing a single rough leaf. Upon examining their roots they appeared shrivelled up as if the want of moisture had been the cause of the failure. On the 3rd of April a few more seeds were sown in exactly the same way, some in a pot and some on the bottom of the pit:

all germinated in six days. To the roots of those in the soil on the bottom of the pit, water was given every three or four days; under this treatment they seemed to do better than without water, but they all died in a week or two. Two more plants are still under treatment with a copious supply of water and a slight shade; and they are now about 4 inches high, producing spiny-looking stems.

What the issue of the experiment may be it is impossible to foresee; and these memoranda are published chiefly for the purpose of attracting attention to the existence of this fruit, in the hope that others will attempt to grow it, and report to the Society their success. For there now remains no problem in Horticulture more difficult to solve than the way of preparing skilfully our artificial climates for the inhabitants of that heated atmosphere, intense light, heavy dews, and barren soil of Southern Africa, where the nails of the hand curl back and split in the season of dryness.

XXXI.—*Game Preserves and Fences.* Part the First. By
Mr. Alexander Forsyth, C.M.H.S., Gardener to the Earl of
Shrewsbury at Alton Towers.

(Communicated June 3, 1846.)

THE species of trees and shrubs that are the most valuable for game-cover are unquestionably the evergreens, since they yield shelter when it is most wanted. Some species of evergreens not only yield shelter and a hiding-place for game and birds of song at all times; but, moreover, supply food, and that at the scarcest time of the year, namely, in winter and early in the spring. *Pernettya mucronata*, for example, is now in the middle of April covered with berries. *Cotoneaster microphylla*, a truly elegant shrub, of the easiest culture imaginable, is now loaded with flowers and fruit. The larger growing cranberry ripens plenty of fruit as large as the berries of the grape-vine, very late in the autumn; and of these berries the birds are so fond, that they seldom will permit a ripe fruit to remain for the table, unless it be covered with a net. The Holly glitters with its rosy crop at Christmas. The Yew-tree is seldom found empty of fruit. The Gorse bursts its pods in the breeding season for the chickens of the wild fowl. The Scotch-fir, and indeed most of the cone-bearing trees, have always grain in store, for the seeds remain a year or two on the trees after they are ripe. The berries of the Mahonias are produced in such profusion, that they are used to feed domestic poultry. *Fuchsia discolor*, from Port Famine,

threatens of itself to overthrow and revolutionize the plants now used as game-cover, for it is as hardy as the Highland fir, produces a fair amount of flowers to recommend it in the first place, and this is succeeded by a wholesome berry, which, besides feeding game, is very useful for tarts; and this berry contains perhaps 50 or 100 seeds, by which the plant can be multiplied to any extent, not to speak of its being so easily obtained from cuttings and layers; and as this plant will make shoots 3 feet long in one season, it has only to get a beginning, and it will readily establish itself in the edges of woodland, and adjoining the rides and drives, where its pendent flowers will every year attract the more attention as the plant gets higher; for all the tribe of Fuchsias requires to be looked up to to be seen to advantage. The common Laurel makes a substantial cover, and though its fruit is of no importance, it must ever be of the first class among plants for ornamental shrubberies within enclosures where cattle cannot reach its poisonous leaves. Gaultheria Shallon has been highly praised for game food and cover; but I have not been able to discern its superiority: in fact, I consider that the common Sage is quite as good as the Gaultheria for these purposes; for the Sage produces seeds as large as yellow mustard-seeds, and the plant grows much quicker than Gaultheria and to a greater height, and is infinitely more easy to increase; but this is not all, since the day may soon come for this plant to be turned to great account, for I have heard it said that the Chinese were surprised to find us sending to China for tea-leaves when we had sage at home: add to this, that the sage will grow in either loam or peat, whereas the Gaultheria requires peat, and, like the soil it thrives in, its leaves have a dark and dull hue: the sage, on the contrary, has a summer mantle of the most beautiful sea-green, and this is changed in autumn to a warm grey, and in this latter dress the plant contrasts well with glades and groups of plants of other shades of colour. The lowly shrub Thyme makes a good sward for green food in winter, and its silvery striped variety contrasting with the yellow or golden thyme are pleasing objects, and form the lowest link in the chain where woodland dies away in grass or gravel, &c. The Box, though a beautiful shrub in itself, makes but a sorry cover, on account of the close and thick-set habit of its spray and branches. The Privet is well known, and of it I may remark, that it is just better than nothing. Although I have succeeded many years ago in striking cuttings of Arbor vitæ in phials of water, and have recently obtained those beautiful trees by hundreds from cuttings in common earth, I should decidedly object to the introduction of either of these, or the Junipers, for they are all too close and stiff, and could at best but form a

hungry home for game and birds of song ; for their fruits are small and strong flavoured, and as for their flowers, they are still less interesting than their fruits.

Passing over the culture of Buck-wheat, Potatoes, Jerusalem Artichokes, and such like herbaceous plants and culinary crops usually cultivated to feed Pheasants, &c., as things too well known to require any notice in a paper of this nature, I come to the crowning plant for game cover, the Rhododendron, which has hitherto been confined to the small and expensive patches of the flower-garden and shrubbery ; but which now seems destined, and that at no very distant period, to skirt the moss and moorland by miles along the mountain path, and closing over the mountain rill ; for as surely as Heather grows now in these localities, so surely will the Rhododendron occupy the same soil, and thrive with equal luxuriance if it has an equal chance, as I shall endeavour to show before I leave this subject ; but I hasten to the consideration of the main question, namely, the culture, and more particularly the propagation, of evergreen shrubs for underwood in established plantations, where the annual crop of acorns would go far to keep flocks of Pheasants, if we could only contrive to eke out the supply of food during the season when the acorns are growing, and could defend the game from the weather and their enemies by a well-ordered plantation of evergreen underwood.

In by far the greater part of the existing forests, woods, and plantations of this country, we find the land producing only one useful crop, namely, timber trees. Now, the cultivation of underwood, whether it be for profit, as in the case of crate-wood, so important in Staffordshire, or for pleasure, as in ornamental plantations and game preserves, seems the natural, and in many instances the necessary accompaniment of tree culture.

To insure the healthy development of timber-trees, it is necessary that they should be kept sufficiently thinned so as not to touch one another ; and if this be attended to, there will be abundant space left for the cultivation of underwood : here then I have succeeded in securing a place for my operations admirably suited to the purpose, and one for which there seems no other candidate. Now, if the trees are allowed to grow so close as to choke the underwood, the plantation of timber-trees must be already suffering irreparable injury ; and, on the other hand, if the trees are thin and no underwood is cultivated, much land must be idle, for it cannot produce good grass, and surely it is high time to dislodge the Bracken Frond and the Bilberry bush, which we generally find disputing the ground with an equally unprofitable pair, namely, the Heath and Bramble. Now the open patches of established woodland, where the rays of the sun

can penetrate, are by far the warmest and the best sheltered situations for the culture of underwood, and more especially for the propagation of it. The outskirts of plantations generally require to be kept thick, or, in other words, to be feathered to the ground, in order to prevent the wind from blowing down or breaking the trees ; and for this purpose underwood of any kind is very useful, but more especially the evergreen species.

Such plants as the Rhododendron, the Gorse, the Laurel, and the Yew, retain their properties of protection and shelter during the winter months, when storms and gales of wind are the most frequent and severe, hence their value as auxiliaries in the rearing of timber as well as of game. To buy or even to plant evergreens to the extent, and for the purposes that I presume they will very soon be carried, would be out of the question ; for I not only contemplate their general introduction as underwood for plantations, and their occupying prominent places in the landscape as groups and glades on hill and moor ; but I wish to bring the matter nearer home, and set them to good service as belts and hedgerows to shelter arable land.

Although trees and tall hedges are exceedingly injurious to the farmer, dwarf evergreen shrubs on the contrary render him valuable assistance in the way of shelter to all low growing crops in exposed situations, and such plants do not shade any land save that on which they stand ; and not having half the amount of foliage to feed that a tall straggling thorn-hedge has, they do not impoverish the land to the extent that common hedges do.

As I am inclined to look upon gardening, in as far as it is carried on in the open air, as only a sort of experimental farming and experimental forestry, I am endeavouring to pave the way for the introduction of the beautiful lines of evergreen hedges into the corn-fields and copses, which have hitherto been confined to the propagating grounds of the principal nurseries, where at the present time they are to be seen in great perfection ; for it is an established fact, that if the shelter were taken away from gardens and nurseries the plants could not be grown in them ; and as we have already got Turnips, Carrots, Cabbages, &c. in the field, which formerly belonged to the garden, it need not be wondered at if I advocate the supply of shelter to these, and such as these, convinced as I am, that it is essential to their full development. Unfortunately this subject embraces so many points, that it looks like rambling from the matter in hand ; but as game is generally diffused, it must be provided for accordingly.

The farmer may perhaps imagine that this arrangement is calculated to shelter a stock that may be ruinous to his grain crops ; but if he will carefully peruse this paper he will find that

I have studied his interest in the first instance, and that my proposals are calculated to make the hedgerows produce fruit as well as shelter, so that their produce may go towards keeping the poor of the parish, besides fruit for the farmer's table and for the market; and when this is accomplished, surely he will not grudge the graceful Pheasant and melodious Thrush the gleanings of the vintage. The hedgerows of some small farms in this neighbourhood have a number of Damson-trees as standards, and in favourable seasons the crop of plums PAYS THE RENT! My father hedged a piece of nursery-ground with gooseberry-bushes, and a very good prickly fence it made; it yielded tart gooseberries, and some very good ripe ones. I observed in the grounds of Mr. Wilmot, the eminent London market-gardener, lines of Flemish Pear-trees trained thus, supporting one another, and forming a substantial fence for the



Showing the mode of training only. The appearance of the trees being that of a thick-set hedge, could give no idea of the pendent fashion of their training, which is a very important point.

division of land, and they were *loaded with fruit*. These may be cited as samples of what *has been done* in this way, leaving what *may be done* for further consideration.

But before I go any further, I must beg it to be borne in mind as a *sine quâ non*, that where Rabbits abound, they must be either confined to warrens, or fairly hunted down to extermination; for it is impracticable to rear either game or cover, or to prosecute the superior culture of any estate with such enemies as those. Unfortunately some proprietors are fond of rabbits, but upon what account I know not, for they are not only inelegant in their appearance, having a short and laboured bound, unlike the graceful movements of the hare; but by their burrowing and scraping they disfigure the face of the landscape, as much as the nuisances of the mole; and rabbits are even worse than moles, inasmuch as the mole does not eat grain or other crops, or bark trees, as the rabbit does; and the mole, moreover, keeps out of sight, whereas the rabbit is constantly ambling across your path to hide him in his scrape. Rabbits yield food for Stoats, Weasles, Rats, &c., which are exceedingly injurious to game and to farmers; but this is not all, for rabbits, on account of their being so easily caught, are the cause of boys learning pilfering habits, and they encourage poachers and re-

ceivers of stolen property, thus maintaining some of the greatest pests to civilised society.

That the value of evergreens must very soon begin to be appreciated, even in an agricultural point of view, there can be no doubt; for when I look at the miles of bare stone walls that divide field from field, and find that the plough cannot come within two or three feet of them, and that consequently that portion which is by far the best in the field is allowed to waste itself in growing weeds, I feel astonished; more especially knowing, as every gardener knows, that such walls would shelter fruit-trees and support them, and that an immense quantity of cider, &c. &c. might be obtained from the south side of a wall, whilst the north side would yield gorse for green food for dairy stock and horses during winter. Nevertheless, while these things are neglected, we find scores of fruit-trees occupying an acre or two of the finest land on the farm.

But to return to the subject of game-cover. As far as the plants that are necessary for game preserves are concerned, I have succeeded in simplifying the process of propagation so much, that the common day-labourer can increase them by millions without the aid of glass or hotbed. It is a common practice to put in cuttings of the common laurel, for example, in winter, and they strike root the next summer, and in the summer of the second year produce lateral branches, and thus become perfect plants in two years. Now, according to my process, three months are sufficient for this purpose, and in that short space of time plants of the greatest symmetry are obtained with roots, stems, and lateral branches. Such is the difference between taking the scion when vegetable life is at the flood, and the old system of waiting till the whole system of the scion becomes indurated and vegetable life has ebbed to the lowest. The buds that had not burst into leaf in April may now be converted into a crop of well-rooted evergreens by October, which is just about the time that we used to take off the cuttings, and had at least a year to wait for their taking root after that.

After transplanting evergreens at nearly all seasons, and after collecting all the information on this point that I could come at, I find from experience that there is a time during the period of growth when dryness becomes actually beneficial to the plant instead of proving injurious to it: this time, then, if it can be accurately ascertained, is the turning point of the transplanting, whether that transplanting be practised on a perfect plant or only on a scion (for rooted plants not later than August or early in September). But in order that there may be no misgivings as to this theory, I will conclude this part of my paper with the reasons that led me to adopt it, and the experiments that

have confirmed its truth. In the first place, then, I would quote a process of long standing, namely, the ringing of fruit-trees, by which means the supplies being cut off, the branch elaborates its juices more richly, and *lives and bears fruit*. The root-pruning of fruit-trees is founded on the same principle, and the effects produced are frequently astonishing. Grafting, and particularly herbaceous grafting, are subject to the same laws, the sap being elaborated by the leaves, or by something acting in that capacity, so long as the scion is maintained at the wound in a uniform degree of moisture, and air is excluded by a compact coat and bandage. Now, to obtain this compact binding, I had recourse to the well-known process of washing common garden earth or clay, or peat, so as to separate the sand and other hard substances, and to leave a mass of fine, almost impalpable, particles, which readily compress into an exceedingly dense form.

From experiments made long ago, I found that certain manures, when mixed with the puddle above described, acquired the valuable property of retaining moisture for a long time when buried under the surface of the soil; and having thus secured the necessary materials, the application of the principles was easy; for when the base of a scion is firmly embedded in a nest where uniformity of moisture and seclusion from the air are maintained, evaporation is prevented, and thus the green cutting becomes enabled to stand the full sun immediately after its insertion. Since it is well known that a healthy leaf thus exposed must either die or work, the fruits of its labour will soon appear in the formation of roots. Having been convinced from numberless experiments of the truth of this theory, I resolved last year to get a labouring man to put in cuttings with his clasp-knife and some dung and clay in an off-hand manner. I have shown the plantation to many gardeners, and we have not seen a failure of one scion in several hundreds done by this labouring man.

The process, which is as follows, is performed when the summer shoots of the Laurel, Privet, &c., have attained a moderate growth, say by the middle of June; but of this any practical gardener will judge correctly from his experience with other kinds of propagation, when he is told that the leaves should be firm and of their full size, and the wood plump and round, with the bark of a bright colour; the shoot, or rather a part of the shoot, is at that time grown, but not ripened, and in this lies the pith of the affair. If the wood is too hard at the base it must be cut off, and where it is too watery at the tip, that too must be cut off; the cutting must then be prepared as cuttings usually are, by cutting off two of the lower leaves and smoothing the base of the scion below the lowermost bud. The scions being

thus made ready, the base of each is to be enveloped in a pellet of prepared grout or mortar about the consistency of leaven. This mortar is to be made from clay and dung, or clay and peat finely and intimately incorporated; and too much stress cannot be laid upon the infinite division and combination of the particles, since they undergo an important change by that process, and become essentially different in the compound from what they were in their simple and separate elements. The scions being thus prepared with balls are to be planted just as if they had roots, in the same way that a dahlia or verbena plant is turned out into the open ground with a ball of earth attached.

XXXII.—*Sketch of a Visit to China, in search of New Plants.*

By Mr. R. Fortune, Superintendent of the Hothouse Department in the Garden of the Society.

[It was mentioned in the Report of the Council, p. 167, that Mr. Fortune was expected home in a few days, on his return from his Chinese mission. He has since arrived, and the following is a brief sketch of his Proceedings during his arduous enterprise. His personal narrative, which is Mr. Fortune's own property, will be made public by himself, and the Council have decided that, in consideration of his zeal and good conduct, they will waive their right to the full details of his observations on Horticulture and Agriculture, in order that they may be incorporated with his personal narrative.]

When the news of the peace with China first reached England in the autumn of 1842, the Council of the Horticultural Society of London, believing that an extensive field of Botanical and Horticultural treasures lay unexplored and unknown in the northern parts of that empire, appointed me as their collector. I left England early in the spring of the following year, and arrived in China on the 6th of July. Several cases of living plants were sent out under my charge, as well as a large quantity of vegetable and flower seeds, the greater part of which arrived in excellent order. The fruit-trees and vegetable seeds were greatly prized by English Residents in the northern parts of the country, where such things succeed much better than they do in the south. Captain Balfour, H. M. Consul at Shanghae, kindly offered me ground in the garden of the Consulate where

I could plant the trees, and where they were to be considered as public property : that is, any one who might apply was to be supplied with grafts at the proper season of the year. By this means the kinds would soon be multiplied and secured in the country until the fruit could be seen and appreciated by the Chinese themselves. Such things are of great value in China, owing to the very bad varieties of both Apples and Pears which the Chinese at present possess.

The voyage out was too much like others of the same kind to afford much worthy of notice, until we reached the beautiful islands in the Java sea. The vessel anchored abreast of the village of Anger, in Java, for the purpose of procuring a supply of water and other fresh provisions, and during the time required for this purpose I gladly availed myself of the opportunity of going on shore. Here I found the fine new variety of *Dendrobium secundum*, which I afterwards sent home, and which has been given away to several of the Fellows of the Society.

Having a fair monsoon up the China Sea, we arrived at Macao in a fortnight after leaving Java. The first view we had of the shores of this celebrated country was far from promising. The islands which lie scattered over this part of the sea, as well as the shores of the main land, have a most bleak and barren appearance. Granite rocks are seen everywhere protruding through the soil, and rearing their heads above the scanty vegetation. The soil of the hills is a reddish clay, containing very little vegetable matter, and is mixed with portions of the granite in a decaying state, and generally has a cracked and burnt appearance. It is of course a little richer in the ravines and valleys, where the best portions are annually washed down by the rains ; but even here it is far from being good soil, at least what would be considered as such in England.

When I landed at Hong Kong, my letters of introduction, both from the Government and from private individuals, procured me many friends, who were most anxious to forward the views of the Society. Messrs. Dent and Co. in particular not only gave me a room in their house, but placed their gardens at Macao and Hong Kong entirely at my service, giving me leave to take from them any plant I might wish to send to England, and to use them for depositing any of my collections in, until an opportunity occurred of sending them home.

As soon as I was fairly clear of the ship I began my researches upon our island of Hong Kong, then in its infancy as a British settlement. This island is a chain of mountains, 1800 or 2000 feet high, sloping in a rugged and unequal manner on each side, down to the sea. It is about ten miles in length from east to west ; in some places three, in others five in breadth, and

contains very little level ground capable of cultivation. In its general features and sterility it is exactly the same as I have already noticed with regard to the other portions of this part of the Chinese empire.

There are few trees of any size to be met with on the island except those kinds, such as *Mangos*, *Lee-chees*, *Longans*, *Wampces*, *Guavas*, and other well known things, which are planted and reared in some of the most fertile spots for the sake of their fruit. *Pinus sinensis* is met with everywhere on the hill sides, but it never attains any size, partly owing to the sterility of the soil, and partly to the practice which the Chinese have of lopping off its under branches yearly for firewood. Several species of *Lagerstræmia* are met with, both wild and in gardens, and are so ornamental when in bloom, that they always reminded me of our own beautiful hawthorn. The Screw pine (*Pandanus odoratissimus*), and two or three well-known species of Palm, are met with on the low land near the sea. As we ascend, the hill sides and ravines become rich in *Melastomas*, *Lycopodiums*, Ferns, *Phaius grandifolius*, and several other familiar Orchideous plants. It is a curious fact, however, that all the fine flowering plants which we admire so much in England are found high up on the hills. The *Azaleas*, *Enkianthus*, and *Clematises*, for example, generally choose situations from 1500 to 1800 feet above the level of the sea.

After three weeks of hard labour and exposure under a July sun, both on the islands and main land in this part of China, I was forced to come to the conclusion at last, that the south had been too much ransacked by former botanists to yield now much that was really new and at the same time ornamental. Two or three good plants, however, to a certain extent repaid me for my labour, and these reached England alive a few months after this time. Their names are *Chirita sinensis*, *Arundina sinensis*, *Spathoglottis Fortuni*, and a curious dwarf *Lycopodium*, which is like a tree fern in miniature.

The heat at this time was very great, the thermometer frequently standing at 92° F. in the shade, and 140° when exposed to the sun, but even this was nothing when compared with those sensations which every foreigner in Hong Kong feels from the dry and heated air, probably caused by the absence or scarcity of trees and shrubs.

Having completed my researches for the season at Hong Kong, I left the island on the 30th of August, and proceeded to Canton and Macao. At Canton the principal objects of attraction in a botanical way are the gardens of the Hong merchants, and the celebrated collections at a place called Fa-tee. The latter are simply nursery gardens, where plants are grown and

exposed for sale. Many beautiful species, almost all natives of the south of China, are met with in these gardens, which, however, possess little that is really new or unknown in England. I believe the only plants of any value which I was able to introduce to this country from the gardens of Canton and Macao were the *Fingered Citron*, the *true Mandarin Orange*, and the striking and beautiful *Camellia hexangularis*.

I now determined to proceed immediately to the northern provinces as soon as I could find a vessel in which I could engage a passage. I sailed on the 23rd of August, and after visiting the island of Namoa, and some others of less note on the way up, I reached Amoy on the 3rd of September. To my disappointment, this part of China was even more steril and barren than that in the province of Canton. The island of Koolungsoo, then in the hands of the British, is divided from Amoy by a narrow arm of the sea. From the number of pretty houses and gardens which were found upon it when taken by our troops, there can be no doubt that it was here where the rich and gay amongst the Amoy merchants had their country and family residences. The gardens, however, pretty as they were, contained few plants of value, or different from what I had already met with at Hong Kong and Canton. Some roses which I sent to the Horticultural Society from that place are said to be very distinct and fine, but I have never yet had an opportunity of seeing them in bloom.

Having travelled all over the country adjacent to Amoy and completed my researches, I sailed again towards the Formosa Channel, on my way to our most northern stations of Chusan, Ningpo, and Shanghae. The monsoon, however, had now changed from south-west to north-east, and we experienced very stormy weather and strong northerly currents, which, of course, were directly against us. The vessel was at last obliged to put into the Bay of Chinchew from stress of weather, and having sprung her bowsprit in the gale, it was impossible for her to proceed. In a day or two her cargo was got out and put into another vessel, in which I also embarked, and we again proceeded on our voyage. This attempt was even more disastrous than the last, for after being out for several days, and nearly through the Formosa Channel, we met one of those dreadful gales so well known to the navigators of these seas; our newest and strongest sails were split to pieces, the bulwarks washed away, and in spite of every exertion we were driven back far below the bay from which we started about a week before. Two plant cases which I had with me at the time were dashed to pieces, and their contents, of course, completely destroyed. The Horticulturists and Gardeners of this country, who are so critical

when they find a few deaths in plant-cases after *a voyage of fifteen thousand miles*, know little of the dangers of the ocean.

During our stay to refit in the bays of Chimoo and Chinchew, I availed myself of the opportunity of exploring the adjacent country. It was on these hills that I found the pretty *Abelia rupestris*, *Campanula grandiflora*, and *Statice Fortuni*, which are now in the garden of the Society at Chiswick. The natives in this part of the country are a lawless and independent race, who care nothing for the Government, and who set the laws of the empire at defiance. I and my servant were sometimes placed in most critical situations amongst them, where a great deal of tact and determination were necessary to get us safely out of their hands.

Our little schooner being refitted, we again hove up our anchor, and stood out to sea. This time the winds favoured us, and in ten days we were safely moored in the beautiful Bay of Chusan. As we approached the islands of the Chusan Archipelago, I was much gratified with the great change in the aspect of the country. There was a freshness and luxuriance about the vegetation entirely different from what I had seen before. Fewer rocks were seen protruding through the ground, and many of the hills were cultivated nearly to their summits, which at once proved the superior nature of the soil. The first glance at the vegetation convinced me that it was very different from what I had seen in the south, and that the north of China must be the chief scene of my future labours in the country.

I now delivered my letters of introduction to Major-General Sir James Schoedde, the officer in command, who very kindly procured me quarters in a Chinese house inside the city of Tinghae, to which I removed from the ship, and immediately commenced operations. I was now fortunate enough in getting acquainted with Dr. Maxwell of the Madras army, who was stationed there at the time. This gentleman, who was an ardent lover of botanical pursuits, had been most indefatigable in his researches, and was consequently able to give me a great deal of valuable information.

I was now continually travelling amongst the hills, not only of Chusan and the adjacent islands, but frequently on the main land, where I went without being molested in any way. The dispositions of the people seemed to have changed with the aspect of their country. Their features were more European; they seemed perfectly harmless, appearing to bear us no ill-will, and frequently were even kind, which is saying a great deal for the Chinese, unless they have some selfish motive for such conduct.

After getting together a considerable number of plants and seeds, an opportunity offered of visiting Shanghae. That port

had not been yet formally opened, and the chances of getting there were few and not to be neglected. I was therefore glad of the opportunity, and sailed for the Yang-tse-Kiang on the 13th of November. As we approached Shanghae, we seemed to have got into a new country. The mountainous scenery had entirely disappeared, and even from the top of our highest mast there was not a hill seen to bound the distant horizon—all in view was one flat level plain. This is what is called the valley of the Yang-tse-Kiang, and is the great northern Nankin cotton district. The land is a deep rich loam, and is without doubt the finest in China, if not in the world.

In a country like this, which is everywhere flat and cultivated, it was not expected that I could find very many wild plants. Two, however, were met with, which have since attracted a considerable share of notice in England. I allude to *Cryptomeria japonica*, and *Anemone japonica*. The latter was found, when in full flower, amongst the graves of the Chinese, which are round the ramparts of the city. It blooms in November, when other flowers have gone by, and is a simple and beautiful ornament to the last resting-places of the dead. If the number of wild flowers in this district was few, they were well made up by those which I afterwards found in gardens and nurseries. From the number of flower-shops in the city, which at this season were filled with Chrysanthemums, I was quite certain that there must be somewhere in the vicinity nurseries for their cultivation, but the great difficulty was to find them out. The Chinese here, who knew little or nothing of us except as their conquerors, were frightened and jealous, and would give no information on the subject. They always suspected that I had some other object in view than simply collecting the plants of their country. At that time I could not speak a word of the language; and my servant, who was brought up from the province of Canton, was equally at fault, so that every thing was up-hill work with us. However, by examining every hole and corner of the city and suburbs, and sometimes getting the boys, who were less jealous than the rest, to assist us, we discovered several nurseries which contained large collections of plants, many of which were quite new and very ornamental. I was also much assisted by H. M. Consul, Captain Balfour, who was always ready and willing to aid me in my pursuits. Amongst other things, a very valuable collection of *Tree paeonies* was obtained at this time.

It was now the depth of winter, and as vegetation was leafless, it was impossible to make any thing like a complete collection until the following year, when the plants would be covered with leaves and flowers. I therefore packed up the things which

I had already secured, and sailed for Ningpo on my way to the south.

Here I had the same difficulties to encounter as I had at Shanghae, owing to the jealousy of the Chinese. Ultimately, however, I discovered several Mandarins' gardens and nurseries, from which I made additions to my collections. All these things were of course out of flower, and some of them leafless at this season of the year; but it will be seen afterwards that many of them proved most remarkable plants. Here, as at most other places, I made many inquiries after the supposed Yellow Camellia, and offered ten dollars to any Chinaman who would bring me one. Any thing can be had in China for dollars! and it was not long before two plants were brought to me, one of which was said to be light yellow, and the other as deep as the double yellow rose. Both had buds upon them, but neither were in flower. I felt quite certain that the Chinaman was deceiving me, and it seemed so foolish to pay such a sum for a plant which I would in all probability throw away afterwards, and yet I could not lose the chance, slight as it was, of possessing the *yellow Camellia*. Moreover, there was a written label stuck in each pot, both of which were old, and apparently the labels and writing had been there for some years. At last we compromised the matter; I agreeing to pay half of the money down, and the other half after the plants had flowered. On these conditions I got the Camellias, and took them with me to Hong Kong. It is almost needless to say that when they flowered nothing was yellow about them but the stamens, for they were both semi-double worthless kinds.

I now hired a Chinese boat, and crossed over to Chusan, where I arranged my collections and sailed for the south, arriving at Hong Kong on the 19th of January, 1844. My chief object now was to get cases made, and my collections packed and shipped for England. About eighteen cases were sent home in three different ships about this time, and several small packets of seeds were sent by the overland mail.

As it was autumn when I was travelling in the north of China, many of the plants on the hills were in seed, and it was impossible for me to say whether their flowers were ornamental or not. I made a selection however upon chance, considering that there would be, at least, some good things amongst them, and that by this means a season would be gained. I did not intend them to be given out to the country until they were proved at the garden, or until I could have an opportunity of seeing them in bloom on the Chinese hills, and of sending a description home. The seeds being in good condition were soon raised, and unfortunately many of them were given away, which did not prove at

all ornamental. Others, however, were really valuable things, amongst which I may mention the *Buddleia Lindleyana*, the *Azalea orata*, and the *Cryptomeria japonica*.

The plant cases to which I have already alluded contained amongst other things the following, many of which have been already given away to the Fellows of the Society :—

<i>Chirita sinensis</i>	<i>Buddleia Lindleyana</i>
<i>Arundina sinensis</i>	<i>Anemone japonica</i>
<i>Spathoglottis Fortuni</i>	<i>Lycoris radiata</i> ?
<i>Fingered citron (true)</i>	<i>Daphne Fortuni</i>
<i>Campanula grandiflora</i>	<i>Forsythia viridissima</i>
<i>Azalea obtusa</i>	<i>Jasminum nudiflorum</i>
" <i>ovata</i>	<i>Weigela rosea</i>
" <i>squamata</i>	<i>Indigofera decora</i>
<i>Abelia rupestris</i>	<i>Cryptomeria japonica</i>

and 12 or 13 very fine new varieties of the Tree Peony, having several shades of purple, lilac, deep red, and white flowers. Besides these, the cases contained a number of valuable plants which have not flowered, and about which little is at present known.

While I was waiting in the south of China for the despatch of the collections just noticed, I took the opportunity of visiting Canton and Macao at two different times, and saw the *Camellias*, *Azaleas*, *Moutans*, and other plants in bloom. The gardens of the Hong merchants and the nurseries at Fa-tee are particularly gay during the spring months with these flowers. The Moutans are yearly brought down from the north to Canton, where they flower shortly afterwards, and are then discarded as useless, as the climate of the south of China is too hot for them; this trade therefore is not unlike that of Dutch hyacinths in Europe.

The mountains near Canton, which I visited in company with the late Mr. Lay, as well as those of Hong Kong, were very gay at this season with the flowers of the beautiful *Enkianthus reticulatus*, *Azalea squamata*, and various other species. This part of China, however, had little to increase my collections, and on the 26th of March I started again for the northern provinces.

The whole of this season was spent in the Chusan, Ningpo, and Shanghae districts, my principal object being to see all the plants of these places in flower, and to mark those which I wanted for seed. In order to do this effectually I was obliged to visit each district three or four times during the summer and autumn.

The Flora of Chusan and all over the mainland in this part of China is very different from those portions of the south which I have already described. Almost all the species of a tropical character have entirely disappeared, and in their places we find others related to things found in the temperate parts of the world. I here met for the first time the beautiful *Glycine sinensis* wild

on the hills, where it climbs in hedges and on trees, and allows its flowering branches to hang in graceful festoons by the sides of the narrow roads which lead across the mountains. The *Ficus nitida*, so common around all the temples and houses in the south, is here unknown, and many of those beautiful flowering genera which, as I before remarked, are only found on the top of the mountains in Hong Kong, here have chosen less exalted situations ; I allude more particularly to the *Azaleas* which abound on the hill-sides of this island. Most persons have seen and admired the *Azaleas* which are yearly brought to the Chiswick fêtes, and which, as individual specimens, surpass, in most instances, those which grow and bloom on their native hills ; but few can form any idea of the gorgeous and striking beauty of these Azalea clad mountains, where on every side, as far as our vision extends, the eye rests on masses of flowers of dazzling brightness and surpassing beauty. Nor is it *Azaleas* alone which meet the eye and claim our attention : *clematises*, *wild-roses*, *honeysuckles*, the *Glycine sinensis*, noticed above, and a hundred other things, mingle their flowers with them, and make us confess that, after all, China is indeed the "central flowery land." There are several species of *Myrtaceous* and other *Ericaceous* plants, which are also common on the hills, but no species of heath has been ever found ; and I believe the genus does not exist in this part of China.

The tallow-tree (*Stillingia sebifera*) is abundant in the valleys of Chusan, and large quantities of tallow and oil are yearly extracted from its seeds. The *Laurus camphora*, or camphor-tree, is also common, and attains a very large size, but, so far as I know, no camphor is extracted or exported from the island. *Thea viridis*—the green-tree shrub—is cultivated in some parts rather extensively ; but if we except a small quantity of tea which is annually sent over to Ningpo and the adjoining towns on the mainland, the whole of the produce is used by the natives themselves. Every small farmer and cottager has a few plants on his own premises, which he rears with considerable care, but seems to have no wish to enter on its cultivation on a larger scale for exportation. Indeed it is questionable if it would pay, as the soil is scarcely rich enough ; and although the shrub grows pretty well, it is far from being so luxuriant as it is in the larger tea-districts of the mainland, which I afterwards visited.

The forests of different varieties of *Bamboo* are very striking, and give a kind of tropical character to the scenery of this part of the country. I do not know anything more beautiful than the yellow Bamboo, with its clean straight stems and graceful tops and branches waving in the breeze ; it always reminded me of our young larch forests in England. The *Pinus sinensis*

noticed in the south is also common here: it seems to be an exception to the general rule, being found over all the country, and in every degree of latitude. The *Cunninghamia sinensis* is also found in abundance; and besides these there are several species of *Cypress* and *Juniper* found growing around the tombs of the rich, which are scattered over the valleys and hill sides.

The fruits of Chusan are of very little importance; nearly all the peaches, grapes, pears, plums, oranges, &c., which are seen in the summer season in the markets, are brought from the mainland. There are two fruits, however, cultivated on the island, which are of considerable excellence; the one is called by the Chinese *Yang-mae*; it is a scarlet fruit not unlike an *Arbutus* or *Strawberry*, but having a stone like a plum in its centre; the other is the *Kum-quat*, a small species of *Citrus*, about the size of an oval gooseberry, with a sweet rind and a sharp acid pulp.

The new plants of the island were seen in flower this season for the first time. Early in the spring the hill-sides were covered with a beautiful *Daphne* with lilac flowers (*Daphne Fortuni*), and the *Azalea ovata*, certainly one of the finest and most distinct species which I have introduced. *Weigela rosea*, one of the most beautiful shrubs of northern China, which was first met with in the garden of a Mandarin near the city of Tinghae on this island, was this spring loaded with its noble rose-coloured flowers. *Buddleia Lindleyana* was also seen this year in great perfection growing in the hedges on the hill-sides, often side by side with the *Glycine sinensis*.

Ningpo is about 40 miles west from Chusan, and is situated on the mainland. My visits here at different times during this summer were attended with much less difficulty than in the preceding autumn. I was now beginning to speak a little Chinese, and was perfectly acquainted with the town, and the whole of the places where the different Mandarins' gardens and nurseries were situated. This was of much importance, as I was able to save so much time which used to be formerly spent in fruitless inquiries. The Mandarins were particularly inquisitive at this time about every thing which related to the movements of the English, or other foreigners, who were likely to establish themselves at their port; and as we were able to keep up a conversation in Chinese, I soon found that my frequent visits were very agreeable to them. The nurserymen too, having found, I suppose, that my money was as valuable to them as that which they received from their own countrymen, were no longer shy, but most anxious to sell me any plants which I wanted.

The gardens of the Mandarins, although small, were extremely gay, particularly during the early months of the year; and, what

was of more importance to me, contained a number of new plants of great beauty and interest. On entering one of the gardens on a fine morning in May, I was struck with a mass of yellow flowers which completely covered a distant part of the wall ; the colour was not a common yellow, but had something of buff in it, which gave the flowers a striking and uncommon appearance. I immediately ran up to the place, and to my surprise and delight found that I had discovered a most beautiful *new yellow climbing rose*. I have no doubt, from what I afterwards learned, that this rose is from the more northern districts of the Chinese empire, and will prove perfectly hardy in Europe. Another rose, which the Chinese call the “*fire-coloured*,” was found in one of these gardens at this time ; it belongs to the section commonly called China roses in this country, but sports in a very strange and beautiful manner. Sometimes it produces self-coloured blooms—being either red or French white, and frequently having flowers of both on one plant at the same time—while at other times the flowers are striped with the colours already mentioned. This will also be as hardy as our common China rose. *Glycine sinensis* is often grown on a flat trellis in front of the summer-house, or forms a kind of portico, which affords a pleasing shade from the burning rays of the summer’s sun. Entwined with one of these trees I found another variety, having very long racemes of pure white flowers, which contrasted well with the light blue of the other. I immediately asked permission from the old Chinese gentleman to make some layers of this fine plant, and I am happy to say that one of these is now alive in the garden at Chiswick. Several other fine plants were procured about this time, which will be described from time to time in the Journal of the Horticultural Society.

After seeing the different gardens and nurseries in the town, I generally left Ningpo for the hills in the district. The natives in this part of the country, as I have already stated, are quite a different race from those in the south, and perfectly harmless in their dispositions : I have often resided amongst their mountains for weeks at a time, and never had any reason to complain of the treatment I received at their hands. The temple of *Tein-tung*, a large monastic building situated amongst the green-tea hills about 20 miles from Ningpo, was a favourite place of resort, owing to the peculiar richness of the vegetation in this part of the country. Here many of the trees and shrubs, which were only found in gardens in other places, were wild on the hills and in the hedges. The *Forsythia* already named was common on the road-sides, and was covered with its bright-yellow flowers in early spring. Several species of *Viburnum* of great beauty, and one *Hydrangea*, were also met with here, besides all the other

plants which have been already noticed as abounding on the hills of Chusan. *Cryptomeria japonica* formed one of the most beautiful and stately trees which are found on the hill sides ; it grows about as tall as a common pine, the stems are perfectly straight, its branches hang drooping down in a most graceful manner, and altogether it is not unlike the Araucarias of Norfolk Island or Brazil, but probably much more hardy. The wood possesses great strength and durability, and is highly prized by the higher classes amongst the Chinese. *Paulownia imperialis*, *Lilium japonicum*, and several other well known Japanese plants, are also indigenous to this part of China, which shows that the vegetation of the two countries must be very much alike.

I arrived at Shanghae this year on the 18th of April, and spent two or three weeks there at different times during the season. My principal object was to see all the plants in the different northern districts as they came into flower, and it was therefore necessary that I should stay as short a time as possible in one place at one time. I have already mentioned that I purchased a collection of *Tree Paeonies* during my first visit in the winter of 1843, which were said to be very splendid things, and entirely different in colour from any plants of the kind which were known in England. The history of this purchase is rather amusing, and affords a curious example of the kind of duplicity which I had to contend with. I had drawings with me of various Moutan Paeonies which were said to exist in the country ; and when these were shown to a Chinese nurseryman in Shanghae, he said he could get them, but that they were only to be procured at a place called *Soo-chou*, distant nearly a hundred miles, and that it would be rather expensive to bring them down. I asked him how many kinds there were, what were the colours of their flowers, and finally expressed a wish to have a certain number of each. He told me very gravely that he would undertake to send to *Soo-chou* for them providing I would pay him at the rate of a dollar for each plant. I was too anxious to get them to make any objections to the price, which, after all, was not much out of the way, if they were to be brought about a hundred miles. In the stipulated time the plants were delivered to me in excellent order and the money was paid. They were then taken down to Hong Kong and despatched to England, where they arrived in very fair condition. I had of course no opportunity of seeing their flowers at that time, and was now (April, 1844) anxious to get some more in flower, and intended to send my old friend back again to *Soo-chou* for another collection, stipulating however this time that all the plants should be in

flower in order that I might have an opportunity of seeing their colours. One morning, however, as I was going out into the country, a short distance from Shanghae, I was surprised by meeting a countryman with a load of Moutans in full bloom. The flowers were very large and fine, and the colours were *dark purples*, *lilacs*, and *deep reds*, kinds of which the very existence was always doubted in England, and which are never seen at Canton. Dr. Lockhart, an excellent Chinese scholar, being with me at the time, we soon found out the name of the Moutan district; and from the state of the roots in the man's basket, I was quite certain that the plants had not been more than an hour or two out of the ground, and that therefore the distance from Shanghae could not exceed six or eight miles, a surmise which we afterwards found to be perfectly correct. This was doubtless the place where my nursery friend had procured his plants in the autumn before, and where he would have gone again had I not been lucky enough to find that I could easily go there myself. Indeed I afterwards discovered that there was no Moutan country in the vicinity of Soo-chou, having met a man from that place in the Shanghae district, where he had come for the express purpose of buying Tree Pæonies to take home. I was now out in the Moutan district daily during the time the different plants were coming into bloom, and secured some most striking and beautiful kinds for the Horticultural Society.

Several very distinct and beautiful Azaleas were added to my collections during this summer at Shanghae, as well as many other plants of an ornamental character which have not yet been described. Many of these things are expected to prove hardy enough to thrive in the open air in this country, and others will make excellent plants for the greenhouse. My researches this year were extended for some distance into the interior, which is intersected in all directions by canals—in fact the canals in the North of China are the highways of the country, and the boats are the carriages. The heat during the months of July and August was very oppressive, the thermometer frequently standing at 100° Fahr. in the shade.

In the autumn, after the seeds which I had marked were ripe, I got my collections together and sailed for Hong Kong, in order to make my shipments for England. These consisted of 21 glazed cases of living plants, and 1 bag of seeds, which were sent home in four different vessels. Many of the plants were of course duplicates of the best species which were shipped in the spring of the same year, but a number of them were now sent for the first time. Amongst the latter the following may be noticed as arriving in England alive for the first time:—

Tree paeonies, with purple and lilac flowers, &c. (20 plants).	Campanula sp. (lilac).
Spiraea prunifolia fl. pleno.	Fortunaea chinensis
" sp.	Lycopodium Willdenovii.
Callistegia pubescens fl. pleno	cæsum.
The Chinese five-coloured rose	Gardenia florida, var. Fortuniana.
Rosa sp. (a curious anemone flowered kind).	Pinus sp. from Japan
Edgeworthia chrysanthia.	Ningpo.
Hydrangea sp. from the woods of Tein-tung.	Juniperus sp. North of China.
Rhynchospermum jasminoïdes.	Bamboos (northern varieties)
Acer sp. from Japan	Viburnum sp. These are fine shrubs, with large round heads of flowers like the Gueldres rose.
Mandarin orange (true)	Shanghai peach—a fine large var.

and several other plants to which I cannot at present give any names. These, of course, will be published, when they flower, in the 'Journal of the Horticultural Society.'

The last shipment at this time was made on the 31st of December, 1844. As it was still winter in the northern provinces, and as nothing could be done in the south, I determined to go over to the Philippine Islands for a few weeks, and accordingly sailed for Manilla in the beginning of January, 1845. As far as I had an opportunity of judging, the vegetation of Luçonia has a great resemblance to the Island of Java and other parts of the Malay Archipelago. In the woods I was surprised to find so many species of the genus *Ficus*; I should imagine that nearly one-half of the indigenous trees belong to this family.

After some trouble I discovered the locality of the beautiful *Phalaenopsis amabilis*, and procured a large supply of the plants for the Society. As my visit here was a secondary object, I had very little time to spare, and therefore took every means in my power to make the most of my time. I was in the habit of making an Indian's hut in the wood my head-quarters for a certain time, where I held a sort of market for the purchase of orchidaceous plants. The ground in front of the hut was generally strewed with these plants in the state in which they had been cut from the trees, and often covered with flowers. The *Phalaenopsis*, in particular, was very beautiful at this time. I was most anxious to get large specimens of this plant, and offered a dollar, which was a high sum in an Indian forest, for the largest specimen which should be brought to me. The lover of this beautiful tribe of plants will easily imagine the delight I felt when I saw two Indians approaching with a plant of extraordinary size, having ten or twelve branching flower-stalks upon it, and upwards of a hundred flowers in full bloom. "There," said they, in evident triumph, "is not that worth a dollar?" "You have gained the dollar," said I, as I paid them the money and took possession of my prize. This same plant is now in the garden of the Horticultural Society;

and although a little reduced, in order to get it into the plant-case at Manilla, is still by far the largest specimen in Europe.

I found few other plants of value, except perhaps two species of *Aërides*, which I have never yet seen in flower; these, however, with some other Manilla plants, are now in the Garden at Chiswick. Upon reference to the Garden Lists on my return, I find that out of four cases of Manilla orchideous plants no fewer than forty-five specimens of the *Phalænopsis* have been given away to the Fellows of the Horticultural Society.

My allotted time having expired, I sailed for my old station in the north of China, and arrived there on the 14th of March. My principal object now was to make another collection of all my finest plants, which I intended to bring home under my own care. I had written to the Secretary of the Society, requesting to be favoured with full returns of the state in which my various shipments had arrived in England, and these lists were now coming to hand by every mail. When I found from these lists that any of the species were perfectly safe, I discarded them from my collections, and only kept the kinds which were either newly discovered, or those which we had been so unfortunate as to lose during the voyage, or which, if not lost, were in doubtful condition.

Foo-chow-foo, a large city on the river Min, was visited this summer for the first time, as well as some of the black tea districts in that part of the province of Foekin. The plants in this district, with a few exceptions, were the same as I had already found either in the south or in the northern part of the empire. This was naturally to be expected, as this part of the country lies about half way between the province of Quantung in the south, and that of Keangsoo in the north of China. When my examination of the country was completed, there was no English vessel in the Min, and I was therefore obliged to take a passage in a Chinese junk, which was bound for the city of Ningpo. On our voyage up the coast we were attacked by fleets of pirates on two different days, and had I not been well armed we must have fallen into their hands, where in all probability my career would have been soon terminated. I had a severe attack of fever at the same time, and altogether was in a most deplorable condition when I reached Chusan, where my countrymen were stationed. Having the greater part of my collections in the country near Shanghai, I was most anxious to know in what state they were; and finding an English vessel about to sail for the Yang-tse-Kiang, I immediately crawled on board in the best way I could, and, with a fair wind, we soon reached our destination. It would be unjust and ungrateful not to mention here the kindness

and hospitality of Messrs. Mackenzie, Brothers, and Co., merchants in Shanghae, whose house was open to me as my home, and where, by the skill of Dr. Lockhart and Dr. Kirk, the fever gradually left me, and I was enabled to attend to my collections.

In addition to the plants discovered last year, I obtained about this time some valuable species from Japan. Every means had been used during my early visit to Shanghae to induce the Chinese nursery-gardeners to import for me Japan plants in the junks which annually trade between Chapoo and that country. Several collections had been brought me, but none of any value until this autumn, when some Azaleas and other plants of much interest arrived.

The whole of my plants from the districts of Foo-chow-foo, Chusan, and Ningpo, being now brought together at Shanghae, I got them packed, and left the north of China for the last time on the 10th of October, on my way to Hong Kong and England. When I arrived at Hong Kong, I despatched eight glazed cases of living plants, the duplicates of which and many others I intended to bring home under my own care. I now went up to Canton, and took my passage for England; and with 18 glazed cases filled with the most beautiful plants of Northern China, sailed on the 22nd of December. We arrived in the Thames on the 6th of May, 1846, having been three years and three months absent from home.

The plants arrived in excellent order, and the following kinds, amongst many others, may be noticed as having been imported this year for the first time:—

Glycine sinensis, with white flowers.	Pinus sp., from Japan, two var.
Azalea obtusa, from Japan.	Oak from Chusan.
" sp. from Japan.	Camellia hexangularis (true).
" four species from the north of China.	" " star," ? a var. of hexangularis.
Prunus sinensis (flore pleno albo).	Spiraea sp.
Dielytra spectabilis.	Lycopodium sp. (" Man neen chung" of the Chinese).
Berberis (Mahonia) Fortuni.	Kum-quat, a curious small orange.
Scutellaria sp., a fine herbaceous plant with blue flowers.	130 plants of Tree Paeonies, consisting of 12 or 14 varieties, having flowers of various shades of purple, lilac, dark red, and white.
Rose, the fine double climbing yellow.	Seeds of the true Shantung cabbage—a very valuable northern kind.
" double white climbing var.	
" dark red do.	
" purple garden kind.	

The number of plant-cases altogether amounted to 69, besides packages of seeds, some of which arrived in better condition than could have been expected, and others in worse. As all my fine plants, however, were sent several times, I find, upon looking over my lists, that there are only two of value which have really been lost to the country: the one is a *Rosaceous shrub* found on the

hills of Chekiang, and the other is a curious *Ranunculaceous herbaceous plant* obtained in a garden near Shanghai; there are dried specimens of both amongst my specimens in the Garden of the Horticultural Society, which may one day lead to their being again introduced.

XXXIII.—*The late Mr. George Loddiges.*

SINCE the publication of the last part of this Journal, the Horticultural Society has sustained a heavy loss in Mr. Loddiges, who, as one of the Council, for many years took an active part in the management of its affairs.

Mr. George Loddiges was a son of the late Mr. Conrad Loddiges, who founded the celebrated nursery at Hackney; he was born on the 12th of March, 1786, married a daughter of the Rev. James Creighton in the year 1811, and died on the 5th of June, 1846, after a long and painful illness. As one of the partners in the great nursery of Conrad Loddiges and Sons, he applied himself more particularly to giving a scientific character to the large collections of rare plants cultivated there. In doing this he was always able to command the assistance of his scientific friends, to whom his unbounded liberality in the communication of even the rarest plants required in their investigations greatly endeared him; but he was also most efficiently aided by his own very extensive practical knowledge of plants, and an energy that knew no fatigue. The collections of Orchids, Palms, and Ferns, assembled in the stores at Hackney by Mr. Loddiges' untiring zeal and munificent expenditure are unrivalled in extent, the Orchids alone amounting in the year 1845, to 1916 species and varieties, and the Palms to 280. And these rare plants were brought together with all the zeal and enthusiasm of a botanist, without regard to the advantages of trade. It was not, however, alone in such classes of plants that the collections formed by the skill of Mr. Loddiges were remarkable. It is probable that no private establishment ever contained anything like an approach to such multitudes of rare species belonging to every cultivable division of the Vegetable Kingdom. This was sufficiently proved by the work called the 'Botanical Cabinet,' which represents 2000 figures of plants growing in the Hackney Nursery, 1700 of which were drawn by Mr. Loddiges himself.

Nor was it alone in that branch of science which is connected with his trade that the knowledge of Mr. Loddiges was conspicuous. He was an excellent ornithologist, and a most skilful

microscopical observer. His collection of humming-birds, which has a great European reputation, is unique. It contains more than 200 species in all states of plumage and age, set up with his own hands, and disposed in a manner unrivalled for beauty and good taste. In this occupation he was engaged for twenty years; and it was his intention to have published a splendid folio work on the subject, when his acquisitions were more complete. But he was not satisfied with the extent of his materials when arrested by the hand of death; and yet they were larger than could be furnished by all the museums in Europe put together.

Mr. Loddiges was one of the earliest members of the Microscopical Society, and was himself the possessor of one of the finest microscopes ever made by Tully. Armed with this magnificent instrument, aided by that singular manual dexterity in the preparation of objects of natural history which was so conspicuously manifested in the display of his humming-birds, and supported by a patience which nothing seemed able to exhaust, he must have been possessed of a store of information which few men ever gained, but which, alas! has departed with him, for he left behind no papers fit for publication.

In his relation to the Horticultural Society his services were long, constant, and valuable. As a member of the Council or Garden Committee, he was always ready to give the Society the advantage of his long practical experience, as well as to enrich the collections at the garden with whatever was most rare and difficult to procure. But this was his invariable conduct towards all public bodies or public objects which met with his approval, as is well known to the many eminent personages who have held colonial governments or been placed in charge of scientific expeditions.

NEW PLANTS, ETC., FROM THE SOCIETY'S GARDEN.

32. GARDENIA FLORIDA, L.; var. FORTUNIANA.

North of China, Mr. Fortune.

The common single and double varieties of this plant are known to every one. That which is now noticed differs merely in the extraordinary size of the flowers, which are nearly 4 inches in diameter, and in having fine broad leaves sometimes as much as 6 inches long. The flowers are pure white, changing to light buff as they go off, and not unlike a very large double Camellia. Their calyx has the long broad lobes of the original species, instead of the narrow lobes, at least twice as short as the tube of the corolla, of *G. radicans*, by which that species is technically known.

It is one of the very finest shrubs in cultivation, and ranks on a level with the double white Camellia, which it equals in the beauty of the flowers and leaves, and infinitely excels in its delicious odour.

May 18, 1846.

33. FORSYTHIA VIRIDISSIMA.*

A fine flowering deciduous shrub, 3 to 6 feet high, with yellow flowers, from the north of China, Mr. Fortune.
“Very ornamental.”

A bush with a very rich green colour, and handsome foliage, looking something like a Viburnum, was received from Mr. Fortune some time before he returned from his mission; but in the absence of flowers it could not be determined. Dried specimens have now supplied the deficiency, and proved it to be a new species of the genus *Forsythia*, of which one only had been previously known to Botanists.

That plant, the *Forsythia suspensa* of Vahl, was called a Lilac by Thunberg, who thus perceived its natural affinity, but was not happy in his identification of it, for although its leaves

* *F. viridissima*; ramis erectis tetragonis, foliis simplicibus oblongis et oblongo-lanceolatis petiolatis versus apicem serratis dimidiâ inferiore integerimis, floribus ante folia breviter pedicellatis geminatis cernuis, sepalis subrotundis convexis ovarii longitudine.—J. L.

are often pinnated, yet its flowers grow in pairs from the axils of fallen leaves, instead of forming terminal panicles. It is described as a very fine shrub, with deep yellow flowers, and growing from 8 to 12 feet high. According to Siebold and Zuccarini, who have figured it, there are two varieties, one with weeping branches, and the other with upright ones; both are said to have been obtained from China by the Japanese, who plant them along with evergreens for the sake of obtaining, from the varied appearance produced in the spring by this plant, a good background to the Peaches, Apricots, and Camellias, that blossom at the same time. This species is said to have been brought alive to Holland in 1833, by M. Verkerk Pistorius. (See *Siebold and Zuccarini, Flora Japonica*, vol. 1. p. 14.)

The species obtained by Mr. Fortune is very distinct from the original *Forsythia*. Its leaves do not appear even to be pinnated, and instead of having an ovate form, they are strictly oblong, or oblong lanceolate. The branches are four-cornered instead of being terete, and are perfectly erect. The calyx is shorter and more membranous, and the flowers are smaller. It is no doubt a very different plant, and may be expected to become a great favourite when the specimens in the Garden are old enough to flower; for then the branches will be found to be loaded, before the leaves, with yellow flowers as large as those of *Chimonanthus grandiflorus*.

In its present state it forms a compact deep green bush, with oblong opposite leaves serrated near the point, but perfectly free from indentations below the middle. They emit a slight balsamic odour, and from their smoothness, want of lustre, and deep rich tint, are very handsome.

Hitherto the shrub has been treated as a greenhouse plant; but it looks as if it might be hardy, at least in situations where the wood can be made to ripen.

May 30, 1846.

The following are Mr. Fortune's observations on this species:—

"This is a deciduous shrub with very dark green leaves, which are prettily serrated at the margin. It grows about 8 or 10 feet high in the north of China, and sheds its leaves in autumn. It then remains dormant like any of the deciduous shrubs of Europe, but is remarkable for the number of large prominent buds which are scattered along the young stems produced the summer before. Early in spring these buds, which are flower-buds, gradually unfold themselves, and present a profusion of bright yellow blossoms all over the shrub, which is highly ornamental.

"I first discovered it growing in the same garden with *Wie-*

gela rosea, which, I have said in another place, belonged to a Chinese Mandarin, on the island of Chusan, and was generally called the "Grotto Garden" by the English. Like the *Wiegela* it is a great favourite with the Chinese, and is generally grown in all the gardens of the rich in the north of China. I afterwards found it wild amongst the mountains of the interior in the province of Chekiang, where I thought it even more ornamental in its natural state amongst the hedges than when cultivated in the fairy gardens of the Mandarins.

"In England it is probable that it will be nearly hardy, but I advise the possessors of it in the first place to keep it in the greenhouse, and to plant it on the conservative wall, until its constitution is proved in the Garden of the Society next winter. It is a free growing bush, and is easily increased by cuttings or layers."

34. DEUTZIA STAMINEA. *Wallich, Plantæ Asiaticæ rariores*,
vol. ii., t. 191.

Presented by the East India Company; raised from seed
in 1841, from the Himalayas.

It is stated by Dr. Wallich that this plant grows on the highest mountains of the great valley of Nepal, and in the province of Kamaon. Dr. Royle speaks of it as being common in Mussooree, and apparently well suited to English shrubberies.

It is a small bush with deciduous ovate-lanceolate stalked leaves, firmly serrated, dull-green and smooth on the upper side, whitish beneath. The flowers are pure white, somewhat larger than those of Hawthorn, in terminal corymbose panicles. The calyx is small, white, with five small triangular teeth. The petals are oblong, and rather crumpled. The stamens have large winged edges produced upwards into a strong tooth. The whole plant has a feeble, somewhat balsamic smell.

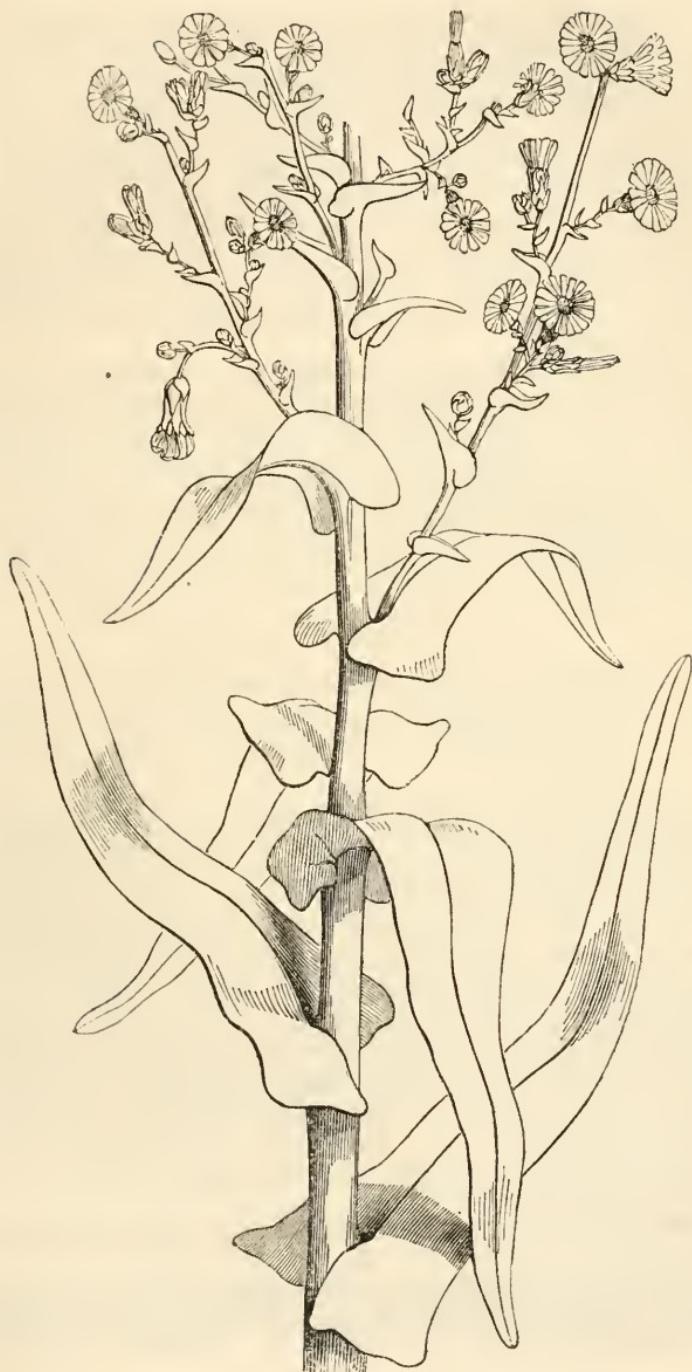
It is a small hardy shrub, growing well in the common garden soil, and easily increased by cuttings of the half-ripened slender young wood; is very pretty and flowers freely in May.

May 22, 1846.

35. HOO-SUNG, or OO-SUNG.

This is a lettuce-like plant, from Shanghai, seeds of which were sent from thence in a letter by Mr. Fortune, and received at the Garden January 9th, 1845.

It is possibly the *Youngia dentata* of De Candolle, or *Prenanthes dentata* of Thunberg.



Stems cylindrical, 2 to 3 feet high, erect, light green, with a green succulent pith, which is the part used. Leaves denticulate, or slightly serrated; the lowest oblong and tapering to the base, the uppermost stem-clasping, somewhat lanceolate, and taper pointed without being acute. The flowers are small, yellow, in panicles slightly drooping. The plant is tolerably hardy, and may be cultivated in the manner of lettuces. Mr. Fortune recommends it to be planted "in rows thinly, say 1½ foot between each plant. It is fit for use when the stem has grown to its full size, which is early in the spring at Shanghai." He also states that it is a vegetable much esteemed by the Chinese, and refers to the following

"*Mode of dressing the Hoo-Sung.*—Pare off the outer skin, cut off the leaves, and take the stalk; either simply boil it with salt, and eat it with pepper; or stew it with a few spoonfuls of soup, or with a little soy, salt, and pepper. The last is the preferable way of dressing this vegetable."

It would probably form a good preserve, similar to that made of the stems of lettuces when running up and before they become hollow.

36. PITTOSPORUM GLABRATUM.*

China, Mr. Fortune, from Hong Kong, May 1, 1845, where it was found growing on the top of the hills, forming a dwarf shrub, and flowering during the early spring months.

This is an evergreen greenhouse shrub, with deep-green rather blistered convex leaves, which shine, as if varnished, when young, and are somewhat glaucous underneath. The flowers appear in terminal sessile umbels, are smaller and more slender than in *P. Tobira*, of a pale-greenish white colour, and very sweet-scented. The form of its leaves and the slenderness of the corolla clearly separate it from that species. There is also a singular tendency on the part of the leaves to assume a whorled arrangement, as in *P. cornifolium* and its allies, especially a Macao species named *P. pauciflorum*, by Messrs. Hooker and Arnott, but the calyx of that species is nearly as long as the corolla, and the petals are represented as spreading away from each other instead of being so rolled up as to resemble a monopetalous corolla.

As yet this species has been treated as a greenhouse plant, but

* *P. glabratum*; foliis subverticillatis obovatis convexis acutis nitidissimis quasi vernice obductis integerrimis subtus glaucis, umbellâ terminali sessili pauciflorâ, sepalis ovatis acutis ciliatis corollâ cylindraceâ angustâ pluries brevioribus.—J. L.

from its appearance there is reason to believe that it may stand out of doors against a wall. It grows freely in rough sandy peat under pot culture, but will probably succeed in common garden soil. It strikes freely from cuttings in silver-sand under a bell-glass without much heat.

Although it makes no show in a greenhouse, yet should it prove hardy, its neat foliage and sweet-scented flowers will render it a desirable plant for a conservative wall.

May 15, 1846.

37. BERBERIS FORTUNI.*

Gardens North of China, Mr. Fortune.

At present we know of but one pinnated Berberry from the North-east of Asia, a plant called by Thunberg an *Ilex*, and reduced to the false genus *Mahonia* by De Candolle. Mr. Fortune has added another, which seems to be quite unlike the *B. japonica* in the form of its leaflets, for Thunberg describes them in the latter as being ovate and but an inch and half long, whereas in this they are narrowly lanceolate, and fully 4 inches long. It is obvious also that the details of the inflorescence of the two are very different.

This species forms a deep green smooth bush, with from 3 to 4 pairs of leaflets, and an odd one to each leaf. The leaflets are about 4 inches long, narrowly lanceolate, acuminate, with shallow distinct spiny serratures. The veins are scarcely visible on the upper side, and very slightly prominent on the under.

As the plant only reached the Garden in April last, no flowers have been seen; but it appears from Mr. Fortune's dried specimens, that they appear in terminal panicled racemes less than half the length of the leaflets. The flowers are small, closely arranged, and of a yellow colour.

There is reason to suppose that this fine shrub will prove to be a *hardy* evergreen. It evidently will grow in any good rich, light, dry, loamy soil, and will be increased by cuttings of the ripened wood, treated in the ordinary way, and struck in a moist temperature. Should it prove hardy, it will be an important addition to our shrubberies.

May 30, 1846.

Mr. Fortune has furnished the following memorandum concerning it:—

* *B. Fortuni*; glaberrima, atroviridis, foliis pinnatis 3-4-jugis cum impari, foliolis lineari-lanceolatis distanter spinoso-serratis acutissimis, racemo paniculato foliis multo breviore ramis lateralibus patulis densifloris.

" This species is an evergreen bush, with pretty pinnated and serrated leaves of a dark green colour, and grows generally from two to four feet high in the north of China, where it flowers in the autumn months. It produces its flowers both from points of the young shoots and from the sides of the old stems; the spikes are short, generally six or seven together, and the colour of the flowers is yellow, which contrasts well with the deep green leaves.

" It was found in a nursery garden near the city of Shanghae, in the north of China. In all probability it is an inhabitant of those provinces which are several degrees farther north than Keangsoo, in which Shanghae is situated, for it is extremely rare in this part of China, and evidently not indigenous to it. If this be the case, there can be little doubt that it will be perfectly hardy in Europe, and will be a very nice addition to our collections of hardy evergreens.

" It will grow well enough in any common garden soil, and I dare say will be found to be easily propagated either by cuttings or layers. It will be a good plant for a rock work, or for a small neat garden where large straggling shrubs are unsuitable."

38. CAMPANULA NOBILIS.*

A Herbaceous plant from Chusan and Shanghae, May and June, 1844; sent home by Mr. Fortune.

The root-leaves of this fine herbaceous plant are deeply heart-shaped, of a bright pale green, and placed on footstalks from 6 to 9 inches long, forming a large tuft. From among them, and to rather more than twice their height, rises the flowering stem, which branches a little at the bottom, and bears upon its divisions several fine nodding flowers, which seem to be the largest yet seen among the genus Campanula. They are something like those of *Canarina*, nearly 3 inches long, and $1\frac{1}{2}$ in diameter. The corolla is pale purple on the outside, and nearly smooth, but paler within, abundantly sprinkled with bright purple dots, and closely covered with long delicate horizontal hairs.

It is allied to the Canterbury Bell (*Campanula Medium*),

* *C. nobilis*; caule ramoso (sesquipedali) foliisque pilosis, foliis grossè biserratis utrinque viridibus radicalibus longè petiolatis altè cordatis ovatis caulinis sessilibus lauceolatis ramis inferioribus brevioribus, floribus versus apices ramorum approximatis racemosis pendulis, calycis ciliati lacinias linearis-lanceolatis corollà triplò brevioribus appendicibus ovatis, corollà elongato-campanulatâ extus glabrà intus villosâ, stigmate trifido.—J. L.

and like it has a calyx furnished with reflexed appendages; but its stigma is trifid, on which account it more nearly approaches the Sarmatian and Dotted Bellworts (*C. sarmatica* and *punctata*). It is however perfectly distinct, and a grand addition to handsome hardy herbaceous plants.

Hitherto it has been treated as a greenhouse plant, but Mr. Fortune is of opinion that it will prove hardy. It grows freely in rough sandy peat, and, like most of the species of *Campanula*, requires an ample supply of water during the spring months. It may be abundantly multiplied by dividing its roots, and possibly from seeds also.

May 29, 1846.

39. *DIELYTRA SPECTABILIS.* *De Cand. Prodr.* 1, 126. (*Fumaria spectabilis*, *Linnaei Amaenitates Academicæ*, vol. vii., p. 457, t. 7.)

Gardens in the North of China, Mr. Fortune.

This plant, which is beyond all comparison the handsomest of the natural order of Fumeworts, was first made known to Europeans by the Russo-Siberian De Karamyschew, who, studying at Upsal, communicated it to Linnaeus. It does not, however, appear to have been seen alive until Mr. Fortune found it cultivated by the Chinese, and brought it home with him.

When in good health its stems grow $1\frac{1}{2}$ foot high, and have three or four axillary racemes of beautiful flowers, each raceme being from 4 to 6 inches long. The flowers are a full inch long, and nearly $\frac{3}{4}$ of an inch wide, with the two saccate petals of a delicate rose colour, and the intervening projecting narrow ones white with a purple tip.

It is to be expected that the plant will be hardy like the others of its race, but too little is yet known of its habits.

May 29, 1846.

40. *ACHIMENES PATENS.* *Bentham Plantæ Hartwegianæ*, p. 47, No. 353.

Mexico, in shady places between Zitacuaro and the Hacienda de Laureles, Mr. Hartweg.

One of the first objects to which Mr. Hartweg directed his attention on his return to Mexico, in 1845, was the recovery of this beautiful plant, which he had found in the course of his former researches, but which had not been reared in the garden of the Society. Although the season was so far advanced that herbage had all become withered, he succeeded in discovering

some roots, which were immediately sent home by the post, and proved to be this plant.

Nor does it disappoint the expectations that had been formed of it; for with the habit and foliage of *A. longiflora* it bears flowers of so intense a violet, that no artificial colours can imitate them. This most remarkable tint fades away on the outside of the corolla into a clear bright purple, and is renewed on the tube of the corolla in an intermediate tint. The border of the corolla is slightly notched, and its tube is extended into a singular blunt horn, which projects beyond the calyx, and is more or less lobed at the sides. The corolla measures about an inch and a half across the flat border, and the tube is rather larger.

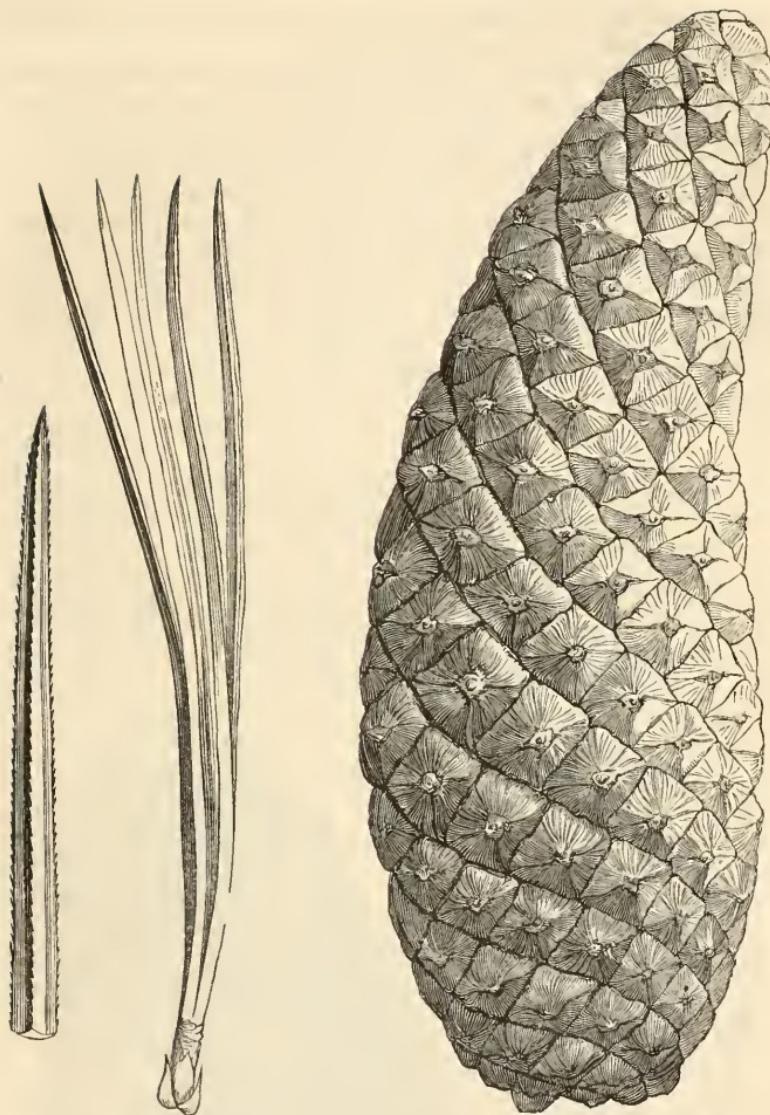
Achimenes patens, like most of the other kinds, may be treated so as to flower nearly at all seasons of the year, and only requires to be kept in a dormant state and quite dry when at rest. It should be started gradually, and grows best in a soil composed of a small portion of well decomposed cow-dung and half decayed leaf-mould, in a very rough state. It is easily increased by the scaly roots, and requires a close atmosphere, but not a very damp or hot one. It is a very handsome kind, being one of the finest both for colour and foliage.

May 29, 1846.

41. *PINUS MONTEZUMÆ*. *Lambert Pinus*, I. t. 22. *Loudon, Arboretum et Fruticetum Britannicum*, p. 1004, fig. 1881.

Found by Mr. Hartweg on the mountains of Mexico, near Ajusco, forming a tree 40 feet high.

Leaves in fives, from 3 to 4 inches in length (on the wild specimens), rather stout, very rigid, triquetrous, rough at the angles, thickly set upon the young branches, and supported by long sharp-pointed brown scales at the base of each sheath. They are of a dark-green colour and much resemble those of *Pinus Pinea*. Sheaths persistent, nearly $\frac{1}{2}$ an inch in length and rather rough; seed-leaves on the young plants from six to eight in number. Branches few, very irregular, rather stout and twisted; bark very rough, particularly on the young wood, which is covered with numerous long, broad, sharp-pointed scales. Buds few, imbricated, non-resinous, and rather lengthened. Cones in clusters of three or four together, but frequently single, mostly incurved, nearly horizontal, from 4 to 5 inches in length, and $1\frac{3}{4}$ in the broadest part, which is near the middle, then tapering to both ends, but especially towards the point, which is rather small. Scales small and nearly equal in size,



from 16 to 18 in depth, slightly elevated, and armed with a small prickle when young. Seeds small and winged.

This Pine is very distinct, both in cones and leaves, from the plant formerly distributed by the Society under the name of *Pinus Montezumae*, and of which Mr. Loudon published an account in his last edition of the 'Arboretum Britannicum,' under the name of *Pinus Montezumæ Lindleyi*, he regarding it

as different from the plant previously published by Mr. Lambert under the name of *Pinus Montezumæ*.

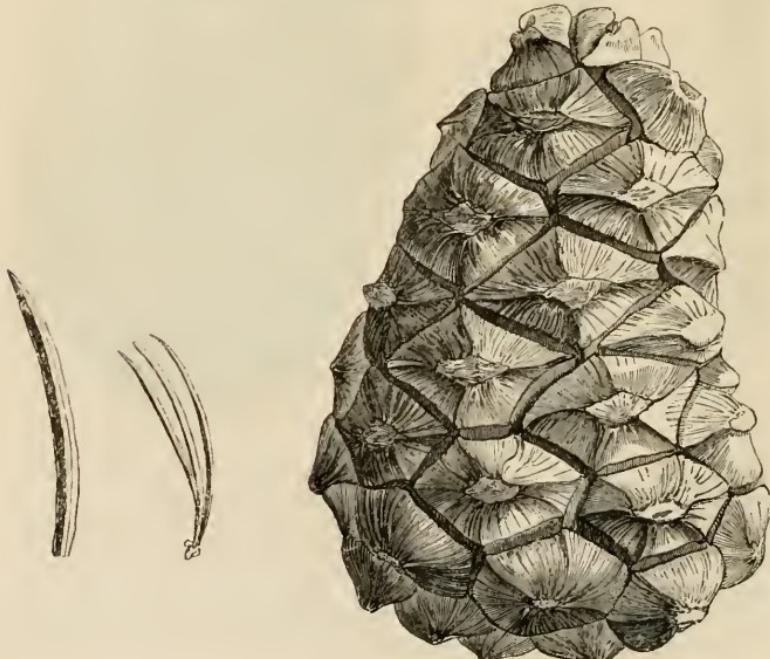
It answers very well to the description of *Pinus Montezumæ* by Mr. Lambert, as quoted by Loudon; but the latter differs in the cones, which are said to be 9 inches long, whereas those received from Mr. Hartweg are only half that length. But Mr. Lambert's account seems to have been partly drawn up from report, as is evident from his stating in one place that his *Pinus Montezumæ* has cones 9 inches in length, and in another place that they are nearly 6 inches long, that is to say, twice as long as those of Swartz's *Pinus occidentalis*. I do not therefore attribute importance to this discrepancy.

Pinus occidentalis, with five very long, rough, slender leaves, must be near *P. leiophylla*.

GEORGE GORDON.

42. *PINUS CEMBROIDES*. *Zuccarini in Flora* 1832, 2. *Beibl.* 93, according to *Bentham's Plantæ Hartwegianæ*, p. 58, No. 440.

Received from Mr. Hartweg, who found it in the cold districts of the mountain Orizaba, near the village of Chichiquila, attaining a height of 30 feet, at an elevation of 10,000 feet above the sea.



Leaves in threes, from an inch to an inch and a half in length (on the wild specimens), rather rigid, slightly twisted at the base, triquetrous, very dense, and of a light-green colour. Sheaths short, and soon falling off or curling up. Seed-leaves on the young plants from ten to twelve in number when they first come up. Branches vertical, mostly in fives, but sometimes more numerous in the whorl, rather slender, slightly incurved and spreading, with tolerably smooth bark and remarkably small buds, which are imbricated and non-resinous, or nearly so. Cones single and sessile, from $2\frac{1}{2}$ to 3 inches in length and $1\frac{3}{4}$ inch broad at the base, with six or seven rows of scales, and tapering but slightly to a blunt point; the scales are rounded at the margins, $\frac{3}{4}$ inch broad, slightly elevated and nearly all of a size, except those close to the base, which are very much smaller and rather hooked. Each scale contains within it two wingless seeds, which are top shaped, slightly angled at the smaller end, and about $\frac{1}{2}$ an inch in length.

This Pine much resembles *Pinus Llaveana* in foliage and general appearance, but it differs in having smaller leaves and cones three or four times the size.

Mr. Loudon in his last edition of the 'Arboretum Britanicum,' p. 993, identifies this Pine with *Pinus Llaveana* of Schiede; but *Pinus Llaveana* has no resemblance whatever with *Pinus Cembra*, either in habit, foliage, or cones. The cones of *Pinus Llaveana* have but three rows of scales, while those of *Pinus Cembra* have eight, and those of *Pinus Cembroides* six or seven scales each; the two latter however much resemble each other in their cones (whence the name *Cembroides*), and chiefly differ in *Pinus Cembra* or the Siberian Stone Pine, having cones rather larger than those of *Pinus Cembroides*, with five leaves instead of three.

Judging from locality and appearance, this Pine is likely to prove hardy in England, and is quite new to the collections of this country.

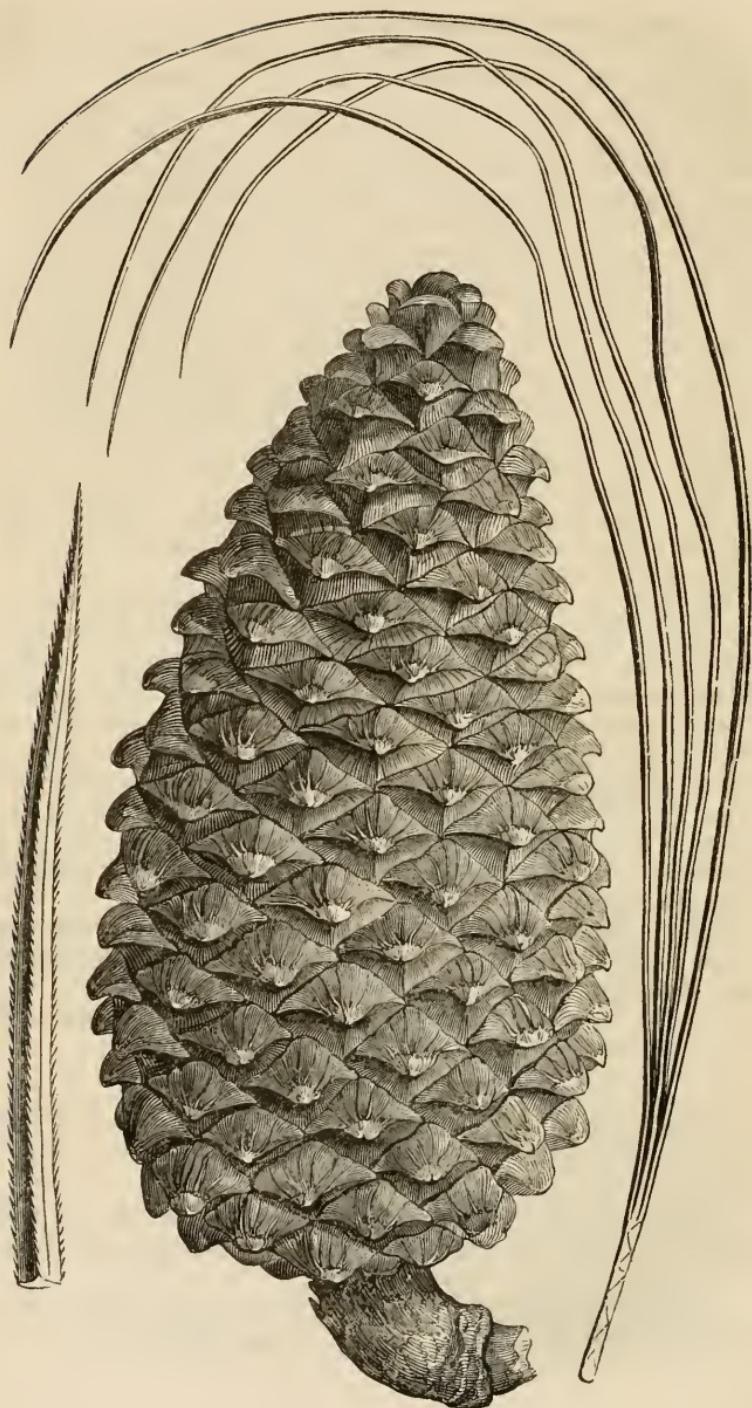
GEORGE GORDON.

43. PINUS ORIZABÆ.*

Received along with *Pinus cembroides* from Mr. Hartweg, who collected it on the mountain of Orizaba, where it forms a tree of moderate size.

Leaves in fives, from 8 to 9 inches in length (on the wild specimens), very slender, sharp pointed, triquetrous, thickly set

* *P. Orizabæ*; foliis quinis filiformi-triquetris angulis asperrimis, vaginâ tereti glabra, strobilis pedunculatis pendulis (4, 5) aggregatis ovatis obtusis, squamis truncatis costatis apice pyramidatis recurvis obtusis.—G. G.



on the branches, very rough at the edges, of a light-green colour, and much resembling those of *Pinus Pseudo-Strobus*. Sheaths persistent, about $\frac{1}{2}$ an inch in length, rather smooth and entire. Seed-leaves on the young plants from seven to eight in number. Branches numerous, spreading, rather irregular, slightly incurved and slender. Bark rather rough. Buds large, light-brown, much imbricated and destitute of resinous matter.

Cones in clusters of four or five, pendulous, from 4 to 5 inches long and $2\frac{1}{2}$ inches broad at the base, straight and tapering to a point, with a footstalk nearly an inch in length, and from 12 to 16 rows of scales in each, which are much elevated, slightly hooked, and nearly all of a size, but rather smaller towards the extremities. They measure about $\frac{1}{2}$ an inch across, and each scale contains two very small seeds, with wings nearly an inch in length.

This Pine is very distinct from any previously known; it resembles the *Pinus Pseudo-Strobus* in habit and foliage, but differs entirely in the cones, which much resemble, but are not half the size of, those of *Pinus macrophylla*.

No evidence has yet been obtained as to the hardiness of this species.

GEORGE GORDON.

44. *CLEMATIS HEXASEPALA*. *De Candolle's Prodromus*, vol. i. p. 5. *A. Cunningham in Annals of Natural History*, vol. iv. p. 260.—(*C. hexapetala*, *Forst. Prodr. n. 230.*)

New Zealand seeds were presented by J. R. Gowen, Esq., in 1844.

This is a little twining plant, with shining nearly smooth ternate or biennial leaves, whose petioles twine round any small body with which they may come in contact. The leaflets are cordate-ovate, coarsely serrated, and often three-lobed. The flowers are small, pale green, very sweet scented, and appear in 3s or 4s from the axils of the leaves. Their stalks are long and hairy, and each has a pair of small bracts below the middle. The sepals are very uniformly six in number, of a narrowly oblong form, and spreading so as to form a small green star. Contrary to the usual structure of the genus, the stamens are constantly 6 only in number, and about half as long as the sepals.

The late Mr. Allan Cunningham gathered it in the northern island of New Zealand, but it was first found by Sir Joseph Banks in 1769, and a drawing of it is said to be preserved in the Banksian Library.

It is a hardy greenhouse plant, requiring a light loamy soil to grow in, and is easily increased by cuttings of the half ripened

wood. It only requires the protection of a cold pit or frame during winter, and flowers abundantly in April.

Although its blossoms are green and inconspicuous, it is far from an unimportant species, on account of its blooming freely, and being very sweet scented.

May 11, 1846.

M E M O R A N D A.

MAMMILLARIA PULCHRA TREATED AS AN AQUATIC.

Having ascertained that Cacti grown in the absence of fresh air succeed best in a moist state, I was desirous of knowing the result, were a plant exposed to the changeable temperature of a greenhouse, and constantly kept in water. On the 11th of June, 1845, a plant of *Mammillaria pulchra*, in a 3-inch pot was placed in a 6-inch pot (not re-potted), which, having the hole in its bottom stopped up, has been kept full with water, and, strange as it may appear to some, the plant is still growing luxuriantly. Among Cacti growers, it is a general custom to keep such plants quite dry during winter, and even in summer some people are afraid to give them more water than moistens the surface of the soil. This single experiment, however, seems to show that the nature of Cacti under cultivation is as yet but imperfectly understood.

JAMES DONALD.

WARD'S CASES IN MINIATURE.

Among various experiments tried in the garden, it was thought desirable to know how long some plants were capable of existing without fresh air or water. To accomplish this, a small plant of *Echinocactus multiplex* was put into a phial, and sealed up on the 24th of March, 1844. Before the plant was put in, the phial was three parts filled with water and a few small stones to support a little turfy peat, in which the root of the plant was placed. Up to the present day (May 29, 1846), the phial has been suspended by a bit of wire on a north wall, except during a short time in the spring of 1845, when the intense frost would have burst it. The plant is still in perfect health, and seems likely to remain so for a long time, although it has not made much progress in growth.

At the same time another *Mammillaria* was put into another phial, in dry sandy soil, and sealed up. It is still alive, but has decreased about one half in size, yet it is not so much dried up but that it would soon recover by the admission of a little water. This has also been hanging on a north wall by the side of the other.

For people who visit foreign countries this experiment would certainly be worthy of a trial, inasmuch as some rare plants might be introduced without much difficulty or expense. Such experience as I have gained teaches me that the main point to attend to is, that in situations like those just described, the plants shall have plenty of light, without being exposed to the direct rays of the sun.—JAMES DONALD.

ORIGINAL COMMUNICATIONS.

XXXIV.—*On the Canker in Apple Trees.* By Mr. Robert Errington, C.M.H.S., Gardener to Sir P. de Malpas Grey Egerton, Bart., M.P., F.H.S., Oulton Park, Tarporley, Cheshire.

(Communicated July, 1846.)

As the pages of the Journal of the Horticultural Society are open to practical as well as scientific papers on gardening subjects, I beg to offer a few remarks on the canker in apple-trees.

I am persuaded that immaturity of wood is the chief cause; and that this immaturity is caused by a course of culture foreign to the habits of the tree.

The wild crab in the hedgerow or the forest is not pampered like a garden Ribston pippin. In the latter case, the overgrown shoots are frequently extending themselves in the end of August: the hedge-crab in the mean time having long ceased to grow. The one still receiving fresh supplies of crude sap—the other busied with its secretions. I believe that a bad habit thus super-induced becomes, after a few repetitions of the abuse, perpetuated, and that “the wearing out of races,” as it is termed, although perhaps not confined to this cause alone, is a necessary consequence, with regard to fruit-bearing trees.

I think that I shall be borne out in the opinion, that gross, long-jointed, and succulent-wooded trees, have been found more liable to this evil than others. Such wood will be looked for in vain in the hedge-crab, and is, I presume, the result of over-cultivation alone. The newly planted apple-tree is manured, whilst the old and overworked is neglected. I am quite of opinion that some portion of this evil is traceable to the treatment this tree receives in the nurseries, and I may add has received for, it may be, centuries. It is well known that the primary object (with our modern nurserymen at least) is to produce a very fine tree in a very short period. Ripening of the wood is scarcely recognised in these establishments—at least, is a principle never carried out. “Good clean wood,” to use a more technical phrase, is the object; and this high-sounding title, when properly translated, merely signifies bloated and ill ripened wood, at least in most of our tender fruit-trees.

The bloated tree, then, is purchased, and moved to the garden, and in many cases consigned to a station which would be far more eligible for a bed of celery. This tree, in the second year, will of course be considered by the inexperienced a magnificent

specimen, and the proprietor admires his newly made garden or newly introduced trees. In the end of August, when un-pampered or neglected trees are found to have grown only a few inches, and that growth is completed, the fresh-planted pet is busy extending a vegetable tissue, which must never become sufficiently solidified, although the shoots have already extended two to three feet. Now, in tender kinds,—and all are tender in degree, the extreme points of this late made wood are destroyed by the ensuing winter; and in the following spring, if unpruned, the fabric of the future tree is to be built out of spongy and immature materials. Now I would ask, with all deference, whether such a course, persisted in for a generation or two, must not produce serious results of some kind, and those of an accumulative character?

I consider that the very stocks, intended for grafting, should not be excited by high cultivation in their early days. They should moreover—more especially to furnish dwarf espaliers, or compact trees for the kitchen garden—be removed two or three times at least in their earliest stages. The first of these transplantations should begin with the seed-bed. To be sure, it would be a delicate process. What then—other plants receive such care, and why not the apple? The nurseryman would, of course, have to charge a little more for the extra trouble; but if the principle can be admitted, why, that should hardly raise a dispute. In the dwarfing system, the chief point is to avoid tap roots; and the preventive system of pruning, as applied by the finger and thumb to the young shoots of forest trees, is equally applicable here. The same kind of system which above ground converts one huge branch into half a dozen, will below ground produce precisely the same effects.

The sure consequence of such a process, duly carried out, is the production of short-jointed and by consequence mature wood. Early fructification is well known to follow in the wake of these matters; and I have no doubt that by means of rightly constituted soils,—a cessation from all digging over the surface, together with a slight top dressing when the heads of the tree require it,—that both durability of constitution, as well as fruitfulness, would be accomplished. In fact, I have proved it a hundred times. In addition to this, how much less trouble in pruning! Scarcely any more wood is produced in one season than is requisite. Over-cultivation also leads to the necessity of root pruning; not the root pruning in the stock, or young tree, which has for its object the prevention of a tap root, and the formation of fibrous surface roots; but that root pruning which is practised in trees of some age, and is the only course left when the tree has been over-excited.

With regard to apple, as well as other fruit-trees, for the kitchen garden, I am persuaded that what I call the platform mode is, of all others, the best adapted to keep trees under the necessary control ; and I am glad to see that Mr. Reid, whose opinions are recorded in Part III. of this Journal, page 176, has found this mode of planting perfectly satisfactory.

I have always found fruit-trees with deep roots more liable to suffer by spring blights than those with roots near the surface ; and no wonder. Every tree is, of course, liable to suffer by spring frosts, as well as the attack of various insects. But the great and essential difference is, that there is a much earlier as well as more wholesome action of root in the tree with plenty of surface roots ; consequently, any damage in the system is the sooner repaired.

I find it thus with my out-door peaches, which are on platforms of only one foot to fifteen inches in depth. If they receive a check, they rally immediately, and have completed all the growth necessary, as far as length of young wood is concerned, almost as soon as the deep rooted trees have been enabled to rally their powers for a late and immature growth. The out-door peaches here were never finer than this season—not a leaf wrong ; and this in a climate so far north of London, a neighbourhood peculiarly liable to chilling winds and rains, and where, in former days, flued walls were deemed essential.

To revert to the apple, I would strongly advise those who wish to follow up a dwarfing system, to adopt the platform mode, not only with the apple, but with all other fruits. Be it remembered, however, that a light sandy soil will never answer if the platforms are shallow ; nothing but a sound and adhesive loam will ensure stability. There is no occasion to rob the best pasture of the turf ; the headlands of old rest loamy land, providing it is sound, will suffice ; and it is astonishing how little of this will be sufficient for a platform. To make whole borders of this material is madness. Since I came to Oulton Park, now eighteen years ago, I have planted some scores of fruit-trees on platforms of this kind, and I have at all times found them all that can be desired ; indeed, there is perhaps less canker here than in any gardens of the same extent in England.

Before concluding, I may, perhaps, be allowed to add a singular circumstance which occurred here, and which, I conceive, tends to throw light on the principle of thorough ripening of the wood in fruit-trees. In the year 1829 I had to remove a row of apple-trees, which had been planted about five years. They had evidently been planted in rich soil, as was evidenced by the gross character of the young wood. Amongst them was a Kerry pippin, which had been dying at the points of the young wood for a year

or two, although making strong wood. These trees, through pressure of business, were "laid by the heels," and neglected for the next summer, barely covered with soil; and at the return of spring I was gratified to find that the Kerry, although it had not grown to half the usual length, had nevertheless perfected that wood, and that for the first time the young wood had endured the winter to the very extremities. This taught me a lesson I could not readily forget. The tree was in the succeeding winter removed to a platform of about fifteen inches in depth, composed entirely of sound loamy soil, and it is to this day equally flourishing, having always produced first-rate fruit of its kind.

As this, as well as other evils, has been brought on in a considerable degree by over-excitement of the root, the only thing that can be done in the way of a preventive is, I conceive, to retrace our steps, by using fresh yet sound soils without manure, and by adopting such plans through the platform mode, or otherwise, as shall preclude, as far as possible, all late and immature growths. The mechanical texture of soils is a matter of considerable import, independent of the question of manuring; and the gardening world may rest assured, that much remains to be accomplished in these matters.

XXXV.—*Game Preserves and Fences.* Part the Second. By Mr. Alexander Forsyth, C.M.H.S., Gardener to the Earl of Shrewsbury, F.H.S., at Alton Towers.

(Communicated August, 1846.)

IF there be any one feature more common than another to the face of all England, that feature assuredly is a grass-field with a hedge around it, and a lane or roadstead along one or more of its sides. Although the field of natural grass does not belong to the subject in hand as yielding much food or shelter for game, yet as it does yield a little, I must, for a very important reason, state its character, and hazard a hope for its amendment. This native herb-land is not in reality a grass-field, since it is seldom composed of plants belonging to the natural order of Grasses more than to any other order containing British plants. On the contrary, from actual observation in various counties, the grass-field is generally composed of a medley of herbs more or less harmless to animals, yet containing many plants that are decidedly poisonous, and very many that are injurious to live stock, and that give an unpleasant flavour to milk and butter. Should any one doubt the veracity of the above statement, let him consult the English Floras or some good botanist, and he will find that whole fields are gay with flowers, and look rich with one sheet of yellow

poison. I particularly allude to the natural order of Crowfoots, which contains, besides Crowfoots, many other dangerous species, whose poisonous properties are intense after a long course of dry weather; and if the natural instinct of the animals were not a better guide than the Botany of the cultivators to enable the cows to discriminate their food, they would assuredly get poisoned. Apropos to the grass-field is the ridge of tall ligneous and herbaceous weeds, which by courtesy may be called the hedgerow. But supposing the fence to be what it very seldom is, a first-rate tall thick thorn hedge, composed of quicksets which are said to be "unequalled either in Europe or America for a hedge-plantation," still I am at a loss to find its virtues and importance to the farmer. But as the Hawthorn is a common plant I have taken the liberty to examine it, and think and judge of its merits from the evidence before me. A common Hawthorn hedgerow then, occupies an extensive ridge of deep land, well laid up to meet the direct rays of the sun, and at the same time well drained and well watered, having a special ditch or gutter cut on each side for its own private accommodation;—an arrangement, by-the-by, worthy of imitation with more valuable crops. The hedgerow being thus comfortably situated, thrives well, and produces—what? Nothing but thorns or prickles! and seeds fit for little else but to increase thorns: its wood shabby in size, and generally shaky in quality, seldom reaches the character of timber, and is mostly faggot-wood, scarcely paying for the labour of cutting; its foliage is of no value; its spray is prickly and unimportant; its flowers are of a sickly pale colour, and of a strong heavy odour; yet after all it has virtues, and they are all concentrated in one point—the point of the spine. The beautiful fields of England are everywhere tied round or wrapt up with this plant and other weeds equally valueless; these thorns have got possession of the best of the land, and from their strength of root and spine, bid fair to keep it as a treasure to the botanist, whose researches furnish us with abundance of arguments to the point in hand, for we find the localities of nearly one half of all the poisonous and uninteresting species of native plants marked as abounding in the pasture-fields, and particularly in the hedge-banks; and if any argument could arouse farmers to a sense of the low ebb to which this branch of agriculture has settled, surely this might, when they see the pasture-field, not "subdued," but asserting its independence, and producing what it pleases, and the hedgerow that they have drained, fenced, ridged, planted, pruned, and watered, producing only a harvest of spines—teeth of dragons;—for the thorn is a name known from the remotest antiquity—not as a fruit-tree or as a plant to be cultivated—but as a ban-word,

witness the language of Holy Writ, where the thorn and the thistle are coupled by the Creator after the fall of man with a curse.*

Although no farmer or other grower of grain or fruit can be expected to grow these for game to feed on, yet the pheasant, the partridge, the bullfinch, and the thrush, do pick the fallen fruit or the scattered grain that would otherwise be lost to the farmer, for he could never afford to pay men to reap so carefully as not to leave a plentiful feast for game and birds of song. But let it not be forgotten, that when a reasonable provision is made for the live stock on the farm, we shall not hear half the complaints that we hear now. When game are supplied with an article of food more agreeable to their taste, they will not commit depredations on the crops of grain; and when the fences which I am about to explain are established, there will be few complaints of rabbits, because they cannot enter a field thus fenced; and when Englishmen can be supplied with plenty of pure unfermented wine made from rich ripe fruit that will cheer and nourish their bodies without intoxicating them, then we shall hear fewer complaints of drunkenness; for the barley requiring a long and expensive process to manufacture it into beer, will find a better market as grain; for surely it would be a wanton waste and worthy only of a madman, to spoil good grain to encourage drunkenness and its accompanying vices, when the highways and hedges on the farm can be made to produce good wine; not to speak of the immense resources offered by dried fruits, not only to the farmer but to the whole community, instead of the everlasting carnival kept in the country by every person whom poverty permits to eat bacon and other flesh-meat with little benefit either to health or morals.

To dry fruits, or in other words, to preserve them, requires in most instances little else than to have the water evaporated from them by means well known: witness that beautiful article of food, the dried apples, called Norfolk Beeflins, and the endless varieties of rich sweetmeats that are actually made by expressing the juices of the soft fruits, and simmering them till they arrive at the consistency of marmalade; or in other words, till they become strong wine, and see what the effect would be upon poor families when they would have at least one half of their dinner every day from fruit in some shape or other. The princes of Germany, with a princely and fatherlike care for the poor, caused the sides of the highways to be planted with fruit-trees, not only to increase the value of the property, but also to afford shade to the traveller, and refreshment on the way. Mr.

* "Thorns and thistles shall it bring forth to thee."

Loudon mentions some such avenues that he passed through sixty miles in length, and loaded with fruit. Surely such avenues of fruit-trees are worthy of our imitation. I would not dwell upon this subject so much were it not for this reason : that the farm is head-quarters for game ; and I regret to see the farmer plodding continually with the herbaceous annual, as if, forsooth, no other plant would pay ; whereas the willow-twigs and the gorse-twigs are more substantial and more wholesome fodder than half the herbage usually collected and dried as hay ; and moreover, it is impossible to carry the culture of herbaceous crops to the greatest perfection without the shelter which ligneous plants alone can accomplish.

It is really astonishing to find that of all the valuable shrubs and trees that will bear the open air in England, I cannot call to mind more than one that I have ever seen cultivated by the farmer for its spray, and that one is the Gorse. Upon the present occasion I must confine myself to naming the Willow and the Mountain-Ash as two more of the greatest importance to the agriculturist and to the game-preserves. The land that will only yield rushes and dirty unhealthy herbage, from being occasionally inundated with muddy water, will yield osier-twigs, a clean standing healthy crop three feet high, with rich juice and a great weight of crop. Loudon mentions, on the authority of Bosc, a French botanist, that horses fed on willow-shoots will travel twenty leagues a day.

And, in regard of the Mountain-Ash, its name implies it to be a tenant of the stormy region ; it is a plant of rapid growth, thriving in a ridge of poor soil, where few plants could live. Its plants are cheap in the nurseries, and it bears transplanting with less loss than most trees. It is readily obtained, and at a very cheap rate, by sowing on the mountains the ripe berries, bearing in mind that they lie a whole year in the ground before they vegetate. As this tree fruits freely, and birds greedily eat the fruit, it is very strange that we do not find it turned to profitable account. From my own experience I have found one valuable use of this fruit. A quantity of the berries were gathered in bunches and built into a stack of barley in harvest-time, and in the following spring the stack being taken down to be threshed, the berries were found to have lost much of their acidity, and were not unpleasant to the taste, and were greedily eaten by poultry and various domestic animals. In times of scarcity these berries have been kiln-dried and ground as food for man, thereby showing that they might safely be used at any time in this dried state for pigs and poultry. I am the more anxious to get this tree introduced into our domestic economy, on account of the berries being of such importance to feed birds and game, and

thereby save corn, and preserve the character of these creatures from being branded as thieves. In short, it would be an easy matter to wean labouring men from barley-juice by giving them good wine and fruit in exchange for it; and if game got fruits and seeds of ligneous plants at home, or in other words, under the same bush that they roost in, they would seldom expose themselves to the dangers of the open field. The hedgerow then, or division between fields, according to my views of the article of whatever plants it may be composed, is to be considered as a barrier against the intrusion of animals, or in other words, a fence.

But besides fencing, I have two other equally important functions for it to perform, namely, to shelter the inclosed and the adjoining crop, and to produce either fine fruit, from which the farmer shall obtain a regular vintage gathering, or good fodder for cattle. The gooseberry, currant, and raspberry, may be given as examples of the sorts of native fruits that I propose to cultivate; and I would fain bring into notice the valuable but neglected bramble, as worthy of the greatest consideration for the making of wine: it holds up its clusters to our view year after year, as the vine of our own country, and tears us with its spines, as if to remind us of the undeserved neglect of its merits. I have tasted blackberries here on a south bank, hanging over the Churnet, that were equal to the much esteemed mulberry, which they very much resembled, and when bruised gave a juice that only required preserving to yield good wine.* The plant, moreover, has length of stem and strength of spine to make hedges and entanglements to any degree of prickly closeness that may be desired. Even the common Barberry is infinitely superior to the Thorn as a hedge-plant, growing as it does to a moderate height, and very compact and spiny, and yielding plenty of fruit, that can with care and skill be made available in domestic economy. Berberis Aquifolium, as has been already observed, is everything that could be desired, being evergreen and of a dwarf close habit of growth, equal to the holly in prickly foliage, and superior to the holly in yielding large and abundant blossoms, succeeded by valuable fruits. As proofs of this latter statement I may mention the fact, that Lord Vernon planted thousands of these at Sudbury Hall in Derbyshire, and under the able management of Mr. Mitchell, these grew beautifully and fruited to such an extent that the fruit was gathered in basketfuls to feed poultry. But this plant, owing to its expense, could not at this time be introduced into ordinary samples of farming, but is admirably suited for the *ferme ornée*,

* Mr. Cooper advertises a patent process of bottling fruit, to preserve such as strawberries for five years.

for which this part of my article is principally intended—convinced as I am, that it is only through model farms, and particularly through gentlemen's farms, that the great and radical changes that I propose can be introduced; as for example, in the next paragraph I propose to feed cattle on the leaves of trees; and this brings me to the fodder department of the hedgerow.

Game are uncommonly fond of the bark of trees and the leaves and seeds of grasses. Rabbits kept in a paved yard will grow fat with willow and fir-branches, and owing to the particular form of the mouth of the rabbit and the hare, they can bark trees more readily when the stick lies horizontally; and this is important in game preserving and in tree preserving to be understood, since a cart-load of willow or other branches strewn about the haunts of hares and rabbits feeds them with that article, and saves standing timber, and they will never twist their necks to eat the upright bark if they can get it straightforward and lying flat. The Willow-tree is suitable to any farm and to any farmer; even the tenant-at-will may reap a return from a plantation of willows the first year, for he will only have to plant the truncheons a little thicker in the rows than the leasehold tenant does to realise a thick standing crop of willow-herbage, which he can use either green or dried, as any other herbage or hay is dried; and as for hedgerows, few plants can equal the willow, for it will send up shoots from the stock six feet high in one season, and after the second year a fox-hunter could not cross the hedge of tall stakes; and I need scarcely add, that the overgrown willows will yield two most important articles, namely, fuel and charcoal, the latter article being equally valuable to agriculture as to horticulture. The value of gorse is already well known to agriculturists; therefore I will pass that over, merely remarking that the spines of the gorse-bush (and be it borne in mind that its leaves are all spines) and the wood of the current year are the eatable parts of that valuable fodder-plant. Here, then, we have the farmer feeding his stock with leaves and sticks. Again, we have the farmer feeding his stock with the leaves and stems of dried grasses and other plants, under the name of hay. Now upon what principle can it be objected to to feed stock upon that far more substantial and nourishing article, the leaves of trees.

The culture of trees and shrubs is altogether a higher order of tillage than the growing of annual crops, such as corn or turnips; any cottager, even the mere clown, selfish and uneducated, will plant a potato-garden when he may reap the fruits in three or four months; but it requires intellect of a superior order to plant a vineyard where a man has to "east his bread upon the waters," and wait so many days, nay years, for a return.

Gardens and farms are made of the same earth, and if a fruitful vineyard has been counted so great and so good an article as to be coveted and longed for by the wisest of kings, surely a farm a hundred times more extensive would become an exceedingly interesting and desirable affair if it were cultivated according to the present advanced state of British Horticulture. I cannot help mentioning two notable examples of fruit-growing to show what really can be done by first-rate gardeners in the open air, with a little British earth. Mr. Plimley showed me the Black Esperione Grape perfectly ripe against a wall in the plain earth of the forcing-garden at Kensington, and Lord Blantyre's gardener has ripened Black Hamburgh Grapes against a flued-wall without glass, in Scotland, despite of wind and weather, by superior skill; the berries finely flavoured, and some three inches in circumference. I mention this to show the value of walls and shelter, and likewise as stubborn facts, to show that England could produce fruit to yield superior food and drink to her children by means which I hasten to explain. And the reason why I dwell upon and reiterate the subject of shelter is that every gardener knows warmth to be one of the essential elements of superior culture; hence I know of no gardener worthy of the name that does not strain to shelter every crop. The finer species of crops, like the finer species of animals, are not to be cultivated without due regard to their shelter, as well as to their food. Hence the want of success with many farmers in exposed situations; for whilst guano and other stimulants are given to the roots of the crops, the better part of the plant being above ground, is left to be broken or chilled by the winds for want of shelter; and thus fine high dry healthy ground, the most pleasant and desirable for man or beast to live on, is DESERTED (that is the proper word to express it); for such is the inclemency of our weather, that neither animal nor vegetable can long endure the pelting of the storm and retain their health; and consequently game and animals desert it, while delicate crops die or suffer injury; but I have often marked the game leaving high ground, and finding shelter on ground still higher, where the strong wind was shorn of its power by the forest of pine-trees.

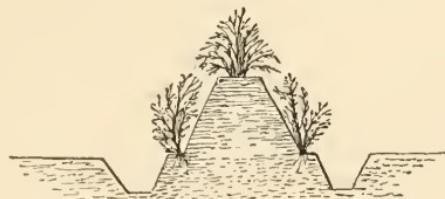
The want of shelter to the farm is at the present day a brand upon our agriculture, and when this desideratum is supplied, the farmer, studying his own interest only, will effectually provide both food and shelter for game without intending to do so—and lest the agriculturist should imagine that trees are unprofitable, I must beg leave to state that I agree with him entirely in this opinion as long as he grows thorns that require labour, and yield nothing but clippings. But Bose's opinion is of importance as a botanist and as a historian, that horses endured

hard work fed on the leaves and shoots of willow. Cobbet speaks of a goat that was fed on paper, and yielded milk all the while; and recent experiments have proved that the fibre of lint may be made into linen, and after repeated washings and bleachings the old linen is torn into the finest shreds and made into paper; yet after all these manipulations this pure fibre is found capable of yielding sugar. It is therefore evident that substances hitherto considered unimportant, may be turned to great account, and among these I have the clearest evidence to show that the leaves and spray of trees are most important articles of food for farm-stock, and although we have for many years practised the barking of the oak whilst standing where it grew in May, in order to get the bark at the proper time, leaving the doomed tree to be felled at leisure, yet it seems to have been left for me to state the value of a standing tree, as yielding for fodder leaves and spray, which may be obtained without injuring the timber by felling the tree just before the fall of the leaf.

The leaves and spray of trees, like the leaves and spray of gorse, must be prepared by bruising, and in some instances by boiling or steaming, and may require to be mixed with other articles of food for the higher order of domestic animals; but it is clearly proved from my own observation, that the goat has a stomach sufficiently strong to digest the leaves and spray of oak and fir trees, and to thrive well on them. My goat has greedily devoured the leaves, spray, and fruit, of the mountain-ash, and seems to relish the spray and leaves of at least twenty species of trees that I have tried her with; in short, there are few trees that do not yield substances much more likely to be converted into sugar or food than pure vegetable fibre, in the form of an old linen shirt, or an old folio volume; therefore, trees or shrubs planted as hedgerows or as shelter may be made to yield fodder as well as fence and shelter.

I purposely avoid speaking here of timber, as that belongs to a different department, and I come to the planting of the highways and hedges on the farm. Now in order to show the construction of an evergreen hedge for shelter, I shall give a section of one, Fig. A. The dyke or bank should be the frustum of a

FIG. A.

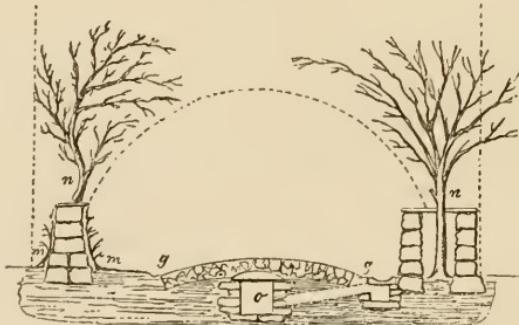


Demidyke and Evergreen Hedge for shelter, &c.

pyramid, and the plants or scions prepared as directed in the first part of this paper, should be placed *in* the bank, not *on* it; for although this hedge is designed to shelter other crops, it requires shelter in the first instance; and it must be borne in mind that it is almost impossible to get evergreens to thrive, even when they have good roots, in an exposed situation; therefore I repeat the caution, that such material as branches of gorse or other brushwood should be stuck in to shelter temporarily the young hedge. With this precaution, and careful planting to an earthen wall, success is certain even on the face of Snowdon. The line on the top or ridge of the dyke requires to be sowed according to a process presently to be detailed. The above description of an evergreen hedge is intended only for bleak and exposed situations. Where the land is of little value it is merely a screen or band to break the force of the prevailing winds.

Where the land is of great value, the fences should be built of some material that should not impoverish the soil: it is a grievous mistake to build a turf wall, because the materials thus taken reduce the productive powers of the soil. Stones are a first-rate article for fences, and in the section Fig. B, which I have given

FIG. B.



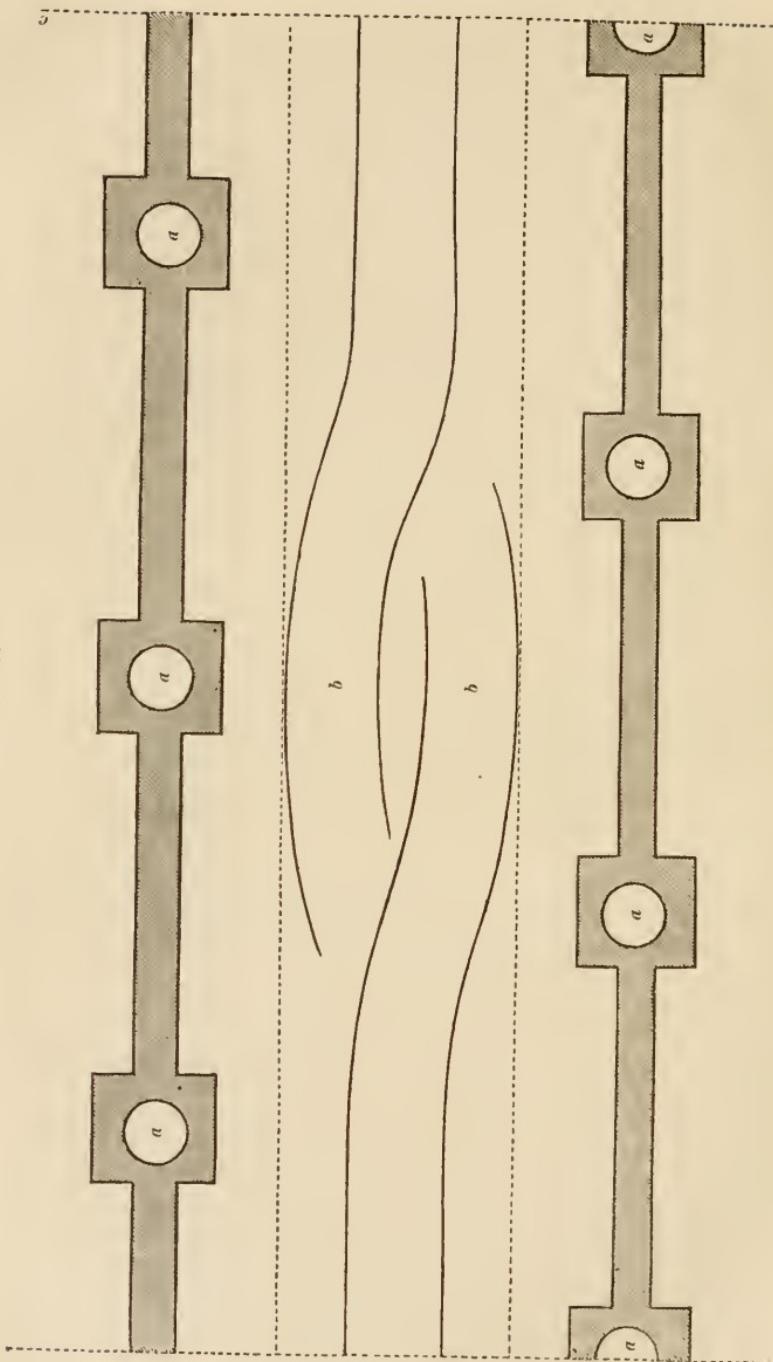
Section of Fruit-trees by a Farm-road side. *n*, Trees, as Cherries, Apples, &c.; *m*, Gooseberries, &c.; *o*, Drain; *g g*, showing the stony part of the road.

of a farm-wall, it is represented as built of stone, and is taken from a sample of walls on the estate of Cluny in Aberdeenshire; but the mud-wall which is common in many counties in England, if it is built of clay or other subsoil, and thatched, as we see it done near Exeter, will answer the purpose which I intend admirably, for it is not at all uncommon to see ripe peaches against walls built of puddle. Hence the introduction of such fruit-walls into localities where fruit is wanted, and where land produces only weeds, cannot be regarded by the most sceptical as an idle theory. In the year 1836 I employed much of my leisure time in collecting fruits and all the information I could acquire respecting their

habits, and by the kindness of friends I obtained many hundreds of specimens of Pears, Apples, and other fruits; and I must not on this occasion forget to mention with many thanks, the great civility and valuable information received at the Society's Gardens at Chiswick, from Mr. Thompson, of the Fruit Department, who was always ready to identify the articles taken to him, thereby insuring the correctness of the remarks that might be made upon any variety as relating to that variety, and to no other. From specimens thus examined in the collections of the principal fruit-gardens in the immediate neighbourhood of London I collected information which the late Mr. Loudon published in *Gard. Mag.* 1837, from which it appeared, that by a particular arrangement in the growing of fruit-trees and fruit-shrubs, from one fourth to one half of the ground of the garden might be cleared and made available for other crops: for the walks and thoroughfares of the garden produce only weeds and mud; and by making these into fruit-borders and walking *on* a pavement and *under* a trellis, the clumsy plain crops of the kitchen-garden become so hid and disguised by the more prominent fruit-trellises, as quite to alter the character of that department into that of the ornamental. I mention this as a precedent, and am glad to find here and there fruit-arches rising over walks in gardens where never any were before 1837; and I would now creep one step further with such encouragement, and show what may be done in the field. The ground-plan, Fig. C, and section, Fig. B, drawn to a scale of 1 inch to 12 feet, will explain my ideas of road-side trees. The tree-guards are made in the wall, thereby acting the parts of buttresses to strengthen it, and as wind-guards to shelter the shrubs, *m*, *m*, that are planted against the wall. The dotted lines show an imaginary arch twelve feet high, and an imaginary line on each side, beyond which the trees must not pass, as it is intended to grow them over the road, and not over the field.

There is really no end to the sinful waste of fine healthy open air and good soil that is everywhere to be seen in the culture of land. I am of opinion that the waste in farming is much greater than the waste that I have shown to exist in gardening above referred to, and that therefore there is the means of growing fruit unemployed to the extent of one-fourth of the land of the whole kingdom; for example, the hundreds of miles of railways require only as much of the earth and air generally as the plan and section of one of their tunnels, and if the trellising of a railway were considered extravagant, surely the beautiful slopes could produce berries of many kinds: witness some already notched and planted with strawberries. The dusty turnpike-roads, the country roads, and the farm-roads and lanes, the idle

FIG. C.

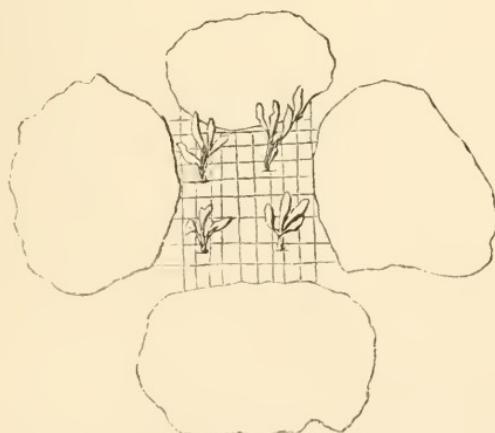


Ground Plan of Farm Road and Walls, showing the tree guards. The section is taken on the line *c c*, and shown in Fig. B; *a a a a a a*, Trees; *b b*, the Track of two Carts crossing, showing the width of the road wanted.

stone walls, and the worse than idle thorn-hedgerows, are all localities capable of producing fruit. The banks of brooks and rivers, the steep stony ground where ordinary tillage is impossible, the edges and gaps of woodland, the square miles of open moor-land and craggy mountain-land, are all capable of producing shelter for game and plenty of fruit; witness the bilberry, how it thrives when the fir-trees are thin on the hill-side, yet thick enough to break the force of the wind. I would not dwell so much on the value of shelter, were I not assured that, from the vine to the vilest weed, no fruit or seed could possibly be produced without the halcyon days necessary to enable the blossom to perform its functions, and those days or hours must be serene.

But to return to the subject of Game Preserves, I may now in conclusion state that the time to try game preserves is when the ground is covered with snow; then the value of such as the Cotoneaster and the like plants will be seen, which produce both food and shelter; and by the method detailed in the first part of this paper, gamekeepers and their assistants can now plant in summer, which is their leisure time, and sow game-cover; and in order that they may see what can be done in this way in a short time, I will tell them, that in a clump of gorse sown here with broom to nurse it, the broom is now more than four feet high in eighteen months, and the game have taken to it for first-rate shelter. This was a bleak spot two years ago, and was thrown in ridges or demi-dykes similar to Fig. A. Small seeds, such as those of the Fuchsia, the Rhododendron, &c. &c., must not be sowed or covered in the ordinary way that cottagers sow

FIG. D.



Stones laid round a Patch or Clump of young Rhododendrons, &c.

their garden-seeds, or they will never grow, from being buried too deep : the seeds should be sowed on the smooth top of a little hillock, and as much straw or moss laid over it as shall barely hide the soil, and on the ends of this straw or moss four stones should be laid, as in Fig. D ; these stones keep the top of the hillock moist, and shelter and guard the seedlings ; and where Rhododendrons are planted out from seed-beds the small plants should be surrounded with stones for the same reasons. Game will rear themselves and preserve themselves better than gamekeepers can do if they are furnished with such food and lodgings as I have proposed, and I look forward to a time when wine and game will be part of the produce of an English farm, since it is quite as easy to rear partridges and pheasants as it is to rear geese and turkeys.

XXXVI.—*On the Winter Culture of the Mignonette.* By Mr. J. B. Whiting, C.M.H.S., Gardener to H. T. Hope, Esq., F.H.S.

(Communicated August, 1846.)

FEW flowers are more esteemed for bouquets in winter and early spring than the sweet-scented mignonette (*Reseda odorata*) ; it is also very useful for the decoration of the drawing-room and conservatory at those seasons of the year. Although the mignonette is not a delicate plant, yet it is not generally seen in the perfection to which it might be brought by the simple method of culture I am about to describe. To flower at or soon after Christmas the seed should be sown in the beginning of August, in pots of any convenient size. The soil should be good loam, moderately enriched with rotten dung, and kept open by a pretty liberal intermixture with old mortar or lime rubbish. It is essential that the pots be thoroughly drained, and upon the drainage a handful (more or less, according to the size of the pots) of one year old pigeon's dung should be placed. After sowing the seed, set the pots where they will not require frequent waterings, too much moisture being extremely injurious to mignonette ; for this reason, therefore, it will be safer to place the pots in a frame or pit, where they may be covered by the lights in rainy weather. As the plants increase in size they should be gradually thinned, ultimately leaving three or five in each pot. The principal point to be attended to now is judicious watering ; by this I mean giving water only when the plants really require water, and then in sufficient quantity to moisten the whole of the soil—not dribbling a few drops over the plants to-day to prevent them from being dry

to-morrow—a practice too much followed with plants in pots. Pinch off any premature flowers that may appear, keep the pots free from weeds, and far enough asunder to prevent the plants from being crowded, and when they are removed to winter quarters, set them near the glass in an airy situation. A few of the plants might be placed in an intermediate house, or other situation rather warmer than a greenhouse, to come into bloom a little earlier than the rest.

I have recommended the seeds to be sown in the pots, which is the method I prefer; but if more convenient, a sufficient number of self-sown plants might be taken up and potted, only a few extra should be put in to allow for casualties, as the mignonette transplants badly. The best mignonette I ever saw grow was treated in this way; but as it is not every gardener who can procure pigeon's dung, I may add, that guano will be found an excellent substitute. This admirable fertilizer must, however, be applied in a liquid state, and not before the pots have become well filled with roots, when a small quantity of guano, given at intervals of a week or so, will increase the vigour of the plants in an extraordinary degree. A second crop might be sown in the beginning of September, and managed in the same manner. Single plants will attain a large size in six inch or eight inch pots, if the main branches are pegged down as they grow and the flowers are kept pinched off for a time.

XXXVII.—*Some Account of Achimenes patens, with its cultivation, and that of the species allied to it.* By Mr. George Gordon, A.L.S., Superintendent of the Hardy Department in the Society's Garden. *With a coloured Plate.*

FEW plants of late years have become such general favourites with the gardener, as the different species of Achimenes, and certainly nothing can be more beautiful, when properly treated, more particularly the Achimenes patens, which is one of the finest, both as regards the habit of the plant, colour of the flowers, and foliage.

The Achimenes patens was first discovered by Mr. Hartweg in September, 1838, in full bloom, when on his first mission to Mexico, on shaded rocky places between Zitaquaro and the Hacienda de Laureles, near Anganguco; from whence he transmitted at the time both roots and dried specimens; but unfortunately, owing to the long detention of the boxes, in consequence of the French blockade of Mexico, none of the roots arrived in a living state, and therefore but little was known of its beauty, beyond what could be learned by inspecting a dried specimen

in the Society's Herbarium at the Garden, or from Mr. Bentham's technical description in the *Plantæ Hartwegianæ*, p. 47, No. 353. Mr. Hartweg, however, on his return to Mexico in the latter part of the year 1845, directed his attention to the recovery of this beautiful plant; and although at the time, when he arrived at the place, where seven years before he first discovered it in bloom, not a vestige even of foliage was to be seen, yet he succeeded in discovering, and transmitting fresh roots to England. These being in a state of repose at the time, arrived at the Garden of the Society the following February, in excellent condition, and produced plants, which flowered for the first time in June last, and still continue in bloom, under the following treatment.

In cultivating *Achimenes patens* and its allies, such as *A. longiflora*, *grandiflora*, *coccinea*, *rosea*, *picta*, and *Leibmanni* (this last appears to be only a beautiful dwarf variety of the *Achimenes grandiflora*, with smaller and deeper coloured flowers), a much longer succession of the blooming season may be produced by varying the time when the roots are first excited in the spring; and with a little judicious management in starting the roots, at intervals of a month, from January to April, plants may be made to bloom in succession from the beginning of May to the end of September; even *Achimenes picta* may be had in bloom all the year round by the same means. But the proper season for starting the roots, so as to produce the largest and finest specimens, is any time from the end of February to the middle of March, and it should be done in the following manner.

The roots (which are bundles of small scales), when wanted for starting, should be separated, at least all those scales which will part from each other freely, and be as it were sown on the surface of the soil in the starting pots; those pots should be filled with a light fibry heath soil, and a small portion of well decayed dung should be mixed with the finer portions of the soil for a top covering. The scales and crown ends of the roots, which sometimes won't separate, should be covered about a quarter of an inch in depth, and then the pots containing them should be placed either in a Melon or Cucumber pit, or any other structure where there is a moderate bottom heat and rather moist atmosphere. The young plants will begin to appear above the surface of the soil in about ten days, and when about two inches in height, must be transferred carefully to pans 4 inches deep and 12 broad (any large pots will do), well drained, and about three parts filled with a mixture of very coarse peat, half decomposed leaf mould, and a small portion of very rotten dung. Each pan should have from six to eight of the young plants carefully

placed in it at equal distances, be afterwards freely watered, and again returned to the warm pit, after which but little is required except attention as to watering, shading, and occasional syringing overhead, when the atmosphere of the pit appears to get rather dry; air however should be given, to prevent excess of moisture and to keep the plants from getting drawn, upon which much of the future success depends. About the middle of May the plants should be removed to a deep pit, where there is no artificial heat used, but which must be kept close and rather moist, except on very bright and warm days, when the plants should be fully screened from the sun and a good supply of back air given, to keep down the internal temperature of the pit; but by no means should a draught be allowed to pass through the plants or pit, for nothing is more injurious to their health than a drying wind.

After this nothing is required but proper attention as to watering, tying up, and keeping free from insects, &c., until they begin to show their bloom buds, when the remaining portion of the pans should be filled up with the same coarse compost as that previously used, thus covering the young creeping stems, and causing the plants to produce many side-shoots. When the plants are in bloom they must constantly be screened from the sun, and never syringed or watered overhead. If attacked with the green fly, much caution is required in using tobacco-smoke, as it very soon injures the leaves; and when the foliage is once injured the beauty of the plants is destroyed.

About the end of September, or sooner, according to the time when the plants have done flowering, withhold water gradually from the roots, and give plenty of air to dry the atmosphere and ripen the tops, and when the tops have become brown, cut them off within an inch or two of the surface of the soil, and remove the pans (soil and roots) to some cool cellar or other similar situation, where the roots are out of the reach of frost and damp. In this situation they may remain all winter, and when any root is again wanted for starting, a portion may be taken out of the pans, and the remainder left for future successions.

If the roots are started about the middle of January they will flower in May; and once a month afterwards is quite often enough for keeping up a good succession.

XXXVIII.—Observations on the Growth of the Pine Apple.

By Mr. James Barnes, C.M.H.S., Gardener to The Lady Rolle, F.H.S., Bicton, near Sidmouth.

(Communicated Aug. 31, 1846, with 3 Queen Pine-apples, weighing respectively 6½ lbs., 5 lbs. 14 oz., and 5 lbs. 11 oz.)

I HAVE sent for exhibition at the Rooms three Queen Pine Apples, not as specimens of superior growth or weight, for I have produced many much finer; but to indicate what may be effected under disadvantageous circumstances and at little expense.

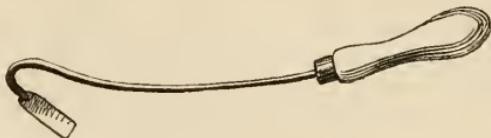
About the middle of August, 1845, the suckers were taken off and placed in 6-inch pots, in rough turf loam and charcoal; they were placed on bricks, and some old half worn out tan was forked up amongst them. By the middle of September they had become well rooted, and were removed into 11-inch pots, using the same material as before, and placing them in the same situation, but thinner. They then grew away rapidly. In the second week in January, 1846, they received their final shift into 15-inch pots, in the same material, and by the second week in March they were good plants, and started for fruit early in May. They never had any fire-heat, but always had abundance of air night and day. They were grown in a common brick pit, heated not with stable-yard dung, but with any fermenting rubbish that could be mustered, for stable dung we had none. The back wall of the old pit fell in on a cold stormy day in May; and the plants had to be removed to peach-houses, vineeries, back-sheds, and such places, while the pit was being repaired. Thus they met with a severe check; nevertheless some of the fruit, after all, swelled to an extraordinary size, more especially the black varieties; two Enville's measured respectively in circumference within a quarter of an inch of 24 inches. Thus it will be seen that tolerably good pines may be produced without extreme close heat and humidity. As to a strong bottom heat for pines or other plants, that is a mere farce; nature does not apply it upon such principles. If we could apply bottom heat, in the shape of heated air rendered humid, and passed through charred materials, quite open and porous for plants to stand on, or to be partially plunged in according to circumstances, we should be coming a little nearer to what nature provides, and then there would be no cavilling about which was the most proper degree of bottom heat to apply, whether 85° or 105°, so long as the whole interior atmosphere was sufficiently warm and charged with ammonia and other gases. As to what degree of atmospheric heat I keep my pines at, it depends so much on the external atmosphere, that I

can hardly lay down a rule for the guidance of others. Under the general system of culture in August and September, we hardly ever look at the thermometer, but throw the lights open night and day, that the wind may have free passage.

The past season having been so fine, I am sorry that I did not make a comfortable preparation in some snug corner out of doors, and turn out a lot that started in May, allowing them first to bloom. Judging from the usage my pines have had this season, I am sure they would have produced in this manner some splendid fruit, and I shall not be satisfied until I have produced Queen Pines out of doors equal to those I have forwarded; and I entertain no doubt as to the accomplishment of my object, even without the aid of glass, after the plants have bloomed.

At the bottom of the box I enclose a fair sample of the soil which I generally make use of. It is put into the pots—bushes, grass, herbage, and all—with some charcoal for drainage, and some charred materials are mixed amongst it as we thrust the sods into the pots; we push it down with large rammers for the purpose, but do not jam it together; we endeavour to have it in a condition to admit a free circulation of air and water, which is the grand object. The kind of soil to be employed in the culture of the Pine I find by experience is of but little consequence so long as the natural herbage, heaths, or furze adhere to it when used, and so long as it is collected healthily and harvested in good condition, and preserved in that state until it is made use of; after which the health of the plants, starting their fruit in due season, and the swelling them off finely and of good flavour, depend wholly on the system of applying heat, air, and moisture, with a sufficiency of such gases as are most congenial to their well doing. I make it a rule to adopt the soil of the locality where I reside with the native plants attached for all purposes of culture. I never go abroad for soils or manures. To be sure we cook a deal of the food for our plants and brew their beverage, and apply it in a clear and wholesome state; we never apply it in a hodge-podge state, or in such quantities as would surfeit a plant, for nothing will produce disease faster than giving extreme application of what is called manure, either solid or liquid. My plan is, to keep the atmosphere changed so that I can breathe comfortably myself, and I find in this the plants maintain that kind of health and luxuriance which I delight in observing. If I could not obtain surface soils with the natural vegetation in my locality, I would collect furze, heath, brushwood, seraps of faggot stacks, grass, or herbage of some kind, and some charred articles, and work it in with the kitchen-garden and other soils which I could get, making it porous so as to admit the natural gases: there can be no difficulty in managing these matters.

I also enclose for inspection a dozen of my little one-handed crane-necked hoes, which long practice has taught me are invaluable in thinning crops, loosening the surface of the soil amongst seedlings, and the surface of the pots, &c. &c., routing out insects, their broods, and larvæ, and thereby admitting readily a free circulation of air to the roots.



XXXIX.—*A Report upon the action of a Tubular Boiler, erected in the Garden of the Society.* By Mr. R. Thompson, Superintendent of the Orchard and Kitchen Garden Department of the Society's Garden.

IT being the opinion of many persons of experience that great advantages as a heating apparatus are possessed by tubular boilers—that is to say, by boilers consisting of coils of tubes containing water—it was determined by the Garden Committee to have one erected in the garden. The following is the result of the trial :—

A tubular boiler was fitted up early in 1844, to heat the curvilinear viney, and the pits in the melon-ground adjoining. One of the tubes which form the bottom of the fire-place gave way in the summer, but was replaced by the maker. Towards the end of the season the boiler again became so leaky as to be totally unfit for use. Perhaps the liability to leak of this kind of boiler may not be general; but, independently of that, it is necessary to mention the following facts respecting its working when sound, which were ascertained in the course of the season.

It was found to be powerful enough; and in this respect the testimonials of the constructor can be sufficiently corroborated. But it is only adapted for such purposes as require a strong fire to be constantly kept up, and not for horticultural purposes; for although the latter may require occasionally the command of powerful heat, yet the smallest possible action is very frequently all that is necessary. At one time the external temperature may be 50° below that which the house ought to be, and at another time not more than 5° . By a strong draught, with fresh supplies of fuel, and the attendance of a stoker, the boiler in question could be made the means of counteracting the 50° ; but if the draught be reduced with the view of causing a slow and prolonged combustion, such as would only be required for coun-

teracting 5° of cold, the apparatus was found in such a case unfit ; for a gentle fire was so damped by being chiefly enclosed by metal kept comparatively cool by the circulation of water within the tubes, that it soon went out. This is a defect which can never be completely obviated whilst the fuel is in contact with a rapid conductor of heat. I have seen a quantity of fuel put in, and well ignited, which ought to have continued burning till seven o'clock next morning, but which did not keep in till four A.M., the time when heat is usually most wanted. For my own part, knowing from experience that there is no difficulty in making up a fire to keep in till morning in a furnace lined with fire-brick or similar non-conducting materials, I should never recommend metal enclosures, wherein a prolonged combustion can never be insured, unless a stoker is afforded throughout the night.

The apparatus in question is also objectionable in regard to economy of fuel. It was found that the portion of fuel next the arched tubes, constituting the sides of the fire-place, and kept cool by the water, was only charred, instead of being consumed, as would have been the case in a fire-place constructed with non-conducting materials. It is well known that in the process of charring or forming coke the hydrogen constituent of the coal must be driven off. In this case it could not have been consumed, otherwise the carbon, which remained in the state of coke, would have been likewise consumed ; for the intense heat resulting from the inflamed hydrogen most certainly would have had the effect of maintaining a red heat in the other portion, and consequently its combustion would have gone on. The coke thus formed was, however, found in the morning not in an ignited state. It, of course, was used in again making up the fire. It was made at a loss—that of the hydrogen constituent of the coal, as above stated. The exact amount cannot be easily ascertained ; and it also differs in the various descriptions of coals employed. Tredgold supposed the loss in such a case might be one-third ; but supposing it is only one-fourth of the heating effect, it is a very important consideration. I prefer estimating the probable loss at one-fourth, although from the subjoined calculations, which I have made from the best data, Tredgold's supposition of one-third is pretty well confirmed.

Data.

1st. $24\text{ C} + 13\text{ H} + \text{O} = \text{Mineral coal.}$

Authority, *Richardson and Regnault.*

2nd. $20\text{ C} + 9\text{ H} + \text{O} = \text{Coking coal.}$

Authority, *Liebig.*

3rd. 1 lb. of mineral coal will melt $62\frac{1}{2}$ lbs. of ice.

Authority, *Watt, Tredgold.*

4th. 1 lb. of hydrogen will melt 320 lbs. of ice.

,,	295 lbs.	,,	Authority, Dalton.
,,	480 lbs.	,,	Authority, Lavoisier.
,,			Authority, Crawford.

Now, according to the 1st, the relative elementary weight of mineral coal will be

Carbon, 24, weighing	. . . .	144
Hydrogen, 13 "	: : : :	13
Oxygen, 1 "	. . . .	8.
		<hr/>
		165
		<hr/>

And if (4th) 1 lb. of hydrogen be sufficient to melt 320 lbs. of ice, the proportion of the $62\frac{1}{2}$ lbs. melted by the hydrogen constituents of the coal will be as $165:320::13=25$ lbs.

In the case of coking coal, less heating effect is due to the hydrogen portion of its composition, because it contains a less proportion of this element. Calculating from Liebig's analysis (2), the hydrogen it contains ought to melt 21 lbs. of the $62\frac{1}{2}$ melted by the combustion of this kind of coal. Or the hydrogen in the composition of coking may be said to produce one-third of the heating effect, and the carbon two-thirds.

The experiment with this boiler has proved the truth of what is stated by Tredgold with reference to fire-places—"There should be no more iron-work about them than is absolutely necessary;" and according to Morveau, as quoted by Tredgold, "the fire-place ought to be isolated from all bodies that are rapid conductors of heat."

The apparatus in question is constructed on a principle the very reverse of that pointed out by the above maxims. It can only be applicable in the case of engines where a strong fire is required to be constantly kept up. The inventor was perhaps not aware that for horticultural purposes a slow and prolonged combustion is also necessary.

XL. Experimental Inquiry into the comparative effect of various Manures upon Kitchen Garden Crops. By Mr. R. Thompson, Superintendent in the Orchard and Kitchen Garden Department of the Society's Garden.

I. ASPARAGUS.

The soil in the Garden of the Society is not so sandy and friable as that which is found to produce almost naturally the finest Asparagus. In 1843 it was considered advisable to try the effects of various artificial manures for the growth of this

vegetable. The beds are 3 feet wide, and a little more than 33 feet in length, the area of each being about 100 square feet.

The following is a statement of the substances employed ; the mode of application ; the expense, approximately ; and the results obtained from weighing 20 of the largest stems in each bed at the end of the growing season, the last week in October.

			Expense of Manure and Applica- tion.		Weight of 20 Stems, with Leaves.
	s. d.	s. d.		lbs. oz.	
1. <i>Potter's Guano</i> , 2 lbs., applied once a fortnight, in 16 gallons water, commencing second week in July; in all 18 lbs., at nine applications :					
Expense of manure	2 3				
,, of application	0 3				
		2 6		5 4	
2. <i>Guano</i> , a handful, about 10 oz.; <i>Salt</i> , 12 oz. in 16 gallons of water, applied once a week for 17 weeks :					
In all, 10 lbs. 10 oz. guano	1 0				
And 12 lbs. 12 oz. salt	0 3				
Expense of application	0 6				
		1 9		5 2	
3. <i>Sulphate of Magnesia</i> , 20 lbs., applied at once, by being spread over the bed in the middle of June :					
Expense of manure	2 2				
,, of application	0 1				
		2 3		4 14	
4. <i>Sulphate of Magnesia</i> applied in 16 gallons of water, as in Exp. No. 1, once a fortnight; in all 18 lbs. :					
Expense of manure	2 0				
,, of application	0 3				
		2 3		4 14	
5. <i>Guano</i> , applied as in No. 1 :					
Expense of manure	1 0				
,, of application	0 3				
		1 3		4 13	
6. <i>Salt</i> , 20 lbs., applied at once, as in No. 3.:					
Expense of manure	0 6				
,, of application	0 1				
		0 7		4 2	

			Expense of Manure and Applica- tion.	Weight of 20 Stems, with Leaves.
7.	<i>Nitrate of Soda</i> , applied, as in the preceding, at once:			
	Expense of manure	3 0		
	,, of application :	0 1	3 1	4 0
8.	Nothing . . . . .	..	..	3 6
9.	<i>Superphosphate of Lime</i> , applied once a fortnight, in 16 gallons of water, as in No. 1; in all 18 lbs.:			
	Expense of manure	2 10 $\frac{1}{2}$		
	,, of application :	0 3	3 1 $\frac{1}{2}$	2 2

The experiments were repeated in 1844, the same beds having respectively the same kind of substance applied as in 1843, with the exception of No. 4, which in addition to the 18 lbs. of Sulphate of Magnesia, had also 18 lbs. of Muriate of Lime. Owing, however, to the remarkably dry season, and drier condition of the stems when cut, the weights obtained in 1844 cannot be fairly compared with those in 1843; but respectively with each other in the same year, they may be

	Lbs. oz.
Nitrate of soda	3 11
Sulphate of magnesia	2 14
Superphosphate of lime	2 12
Guano	2 2
Potter's guano	2 1
Guano and salt	2 0
Salt	2 0
Nothing	2 0
Sulphate of magnesia and muriate of lime	1 4

The increase or decrease per cent. of weight of produce compared with that from the bed which had no manure is shown in the following table:—

	1843.	1844.
Potter's guano	+55 per cent.	+3 per cent.
Guano and salt	+51 "	+0 "
Sulphate of magnesia, applied at once	+44 "	+43 "
Ditto ditto once a fortnight*	+44 "	-37 "
Guano	+42 "	+ 6 "
Salt	+22 "	+ 0 "
Nitrate of Soda	+18 "	+84 "
Superphosphate of lime	-37 "	+37 "

* Muriate of lime in addition in 1844.

It appears from the above, that in 1844, most probably owing to the dry state of the weather, the results from Potter's Guano fell from an increase of 55 per cent. to 3. Guano and Salt, in like manner, from 51 to 0. Sulphate of Magnesia, applied at once, gave the steadiest results, being an increase of 43 or 44 per cent. in both years; but this substance applied at intervals, together with Muriate of Lime, in 1844 fell back 81 per cent. Superphosphate of Lime, on the contrary, rose its produce 74 per cent., or from 37 less in 1843 than that from the bed which had no manure, to 37 above it in 1844.

Taking the average of the two years,—

Nitrate of soda	gave an increase of	51	per cent.
Sulphate of magnesia, applied at once	. . . . .	43½	"
Potter's guano	. . . . .	29	"
Guano and salt	. . . . .	25	"
Guano . . . . .	. . . . .	24	"
Salt . . . . .	. . . . .	11	"

As regards the action of the latter, the following is an extract from the Report for the Garden Committee, June 30, 1845:—

“Common Salt, applied last summer as manure for Asparagus, has this season occasioned an earlier production of shoots. The soil in the Garden is rather stiff for Asparagus, and Salt has the effect of rendering it friable; and to this circumstance the earliness may perhaps be ascribed. It therefore remains to be proven whether in soils sufficiently sandy, the application of salt would cause so much difference.

II. CASTELNAUDARY BEET.

Sown April 27th in drills about 2 inches deep, and 15 inches asunder; the plants being thinned to 9 inches apart in the rows. The manures were scattered along the bottom of the drills; the Guanos having been mixed with about 7 parts of fine soil, and watered previously to sowing.

The crop was taken up November 16th; the day was fine, and the hygrometer indicated 4° of dryness, consequently the leaves had no wet lodging on their surfaces. The roots were cleared of soil as much as could possibly be done without washing, or breaking the fibres.

Substances employed as Manures.	At Rate per Acre.	Approximate Cost per Acre.	Weight of Produce, per Acre.		Total Weight of Produce per Acre.
			Roots.	Tops.	
	Cwt. lbs.	£. s. d.	Tons. cwt. lbs.	Tons. cwt. lbs.	Tons. cwt. lbs.
1. Potter's Artificial Guano	4 5	2 15 6	28 0 96	37 4 24	65 5 8
2. Guano e—Gibbs . . .	4 5	2 8 0	22 13 0	29 13 4	52 6 4
3. Guano GL—Gibbs . . .	4 5	2 8 0	21 11 48	29 13 24	51 4 72
4. Charcoal-dust	75 bush.	6 0 0	20 4 52	29 7	49 11 104
5. Ditto and wood ashes .	75 bush.	5 0 0	21 0 72	27 4 76	48 5 36
	Cwt. lbs.				
6. Guano c—Gibbs . . .	4 5	2 8 0	18 12 12	28 17 4	47 9 16
7. Guano MA—Gibbs . . .	4 5	2 8 0	18 6 80	23 9 20	41 15 100
8. No manure . . . .	..	..	15 15 54	25 17 80	41 13 22

III. LETTUCES.

The following are the results of experiments with manures, applied to a plantation of White Paris Cos Lettuces, May 31st, 1844, at the rate of about 4 cwt. per acre. The Lettuces were cut over by the ground and weighed on the 9th of July, they being then in perfection.

Manured with—	10 Heads weighed—	
	Lbs.	oz.
Peruvian guano	16 12
Sulphate of ammonia	16 6
Superphosphate of lime	15 12
Nitrate of soda	15 12
Humphrey's farmers' compound	15 7
Muriate of ammonia	15 5
Potter's guano	14 10
Nothing	14 10
Sulphate of magnesia	13 10

It appears that in dry seasons, like that of 1844, these kinds of manures have little effect. The above were well watered after they were applied; but still they did not act so well, in comparison with the unmanured, as they were observed to do in the preceding wet season. It will probably be found better to mix them thoroughly with some bulk of soil, and then dig in the compost in the usual way.

IV. POTATOES.

The Potatoes, Bread-fruit variety, were cut into sets, and planted May 3rd, in rows $2\frac{1}{2}$ feet asunder, about 7 inches apart in the rows, and 6 inches deep. After being mixed with about 7 parts of fine soil, the Guano manures were scattered along the bottoms of the trenches, and then watered from the rose of a watering-pot.

The crop was taken up, and weighed October 21st. Many of

the tubers were injured by slugs; and on this account the relative amounts of total produce, it is presumed, will afford the best criterion of the value of the respective substances as manures—so far at least as such can be determined by the experiments of only one season.

Substances applied as Manures.	At Rate per Acre.	Approximate Cost per Acre.	Produce per Acre.		Total Produce per Acre.
			Large.	Small or Damaged.	
	Cwt. lbs.	£. s. d.	Tons. cwt. lbs.	Tons. cwt. lbs.	Tons. cwt. lbs.
1. Guano F— <i>Gibbs</i> . .	4 5	2 4 6	12 10 86	5 3 91	17 14 5
2. Potter's Artificial guano . .	4 5	2 10 6	15 2 0	2 0 50	17 2 50
3. Charcoal dust . . .	75 bush.	6 0 0	10 14 104	5 18 72	16 3 64
	Cwt. lbs.				
4. Sulphate of magnesia. .	16 20	7 10 0	10 10 36	5 7 96	15 18 20
5. Guano MA— <i>Gibbs</i> . .	4 5	2 4 6	10 19 85	4 6 32	15 6 5
6. Guano C— <i>Gibbs</i> . .	4 5	2 4 6	11 17 32	3 4 80	15 2 0
7. Bone-dust . . .	16 20	9 0 0	8 9 98	5 18 72	14 8 58
8. Bone-dust . . .	10 88	6 0 0	7 2 102	6 14 14	13 17 4
9. Guano GL— <i>Gibbs</i> . .	4 5	2 4 6	10 10 36	3 4 80	13 15 4
10. Sulphate of magnesia. .	10 88	5 0 0	10 4 104	2 19 36	13 4 28
11. No manure . . .	..	..	10 15 80	1 6 108	12 2 76

It appears from the above table of results, that Guano, of the description marked *E*, from Gibbs, affords the most profitable return, after deducting the price of the manure; and next to it Potter's Artificial Guano; after which rank in the same respect, Gibbs's Guanos, *M A*, *C*, and *G L*. The produce of the latter is exceeded by that where Bone-dust was employed; and the *M A.* and *C.* Guanos by Charcoal-dust, and Sulphate of Magnesia; but the expense of these is too great in proportion to the return.

XLI.—*A Notice of the Tein-ching, or Chinese Indigo.* By Mr. R. Fortune, Superintendent of the Hot-house Department in the Society's Garden.

(Communicated Sept. 1, 1846.)

WHEN in the north of China my attention was directed to a plant largely cultivated by the inhabitants for the sake of its blue dye. In the southern provinces a considerable quantity of indigo (*Indigofera*) is cultivated and manufactured, besides a large portion which is annually imported from Manilla and the Straits. In the north, however, the plant which we call indigo is never met with—owing, I suppose, to the coldness of the winters—but its place is supplied by this *Isatis indigotica*, or the “*Tein-ching*,” as it is called by the Chinese.

I met with it in the Nanking cotton district, a few miles west from Shanghai, where it is considered a plant of great import-

ance, and covers a large tract of country. It is grown in rows, a few inches apart, and at a distance looks like a field of young turnip or cabbage plants. In June, 1844, when I was in that country, the plants were from six inches to a foot in height, and being considered in perfection the natives were busily employed in cutting them and removing them to the manufactory. One of these places which I inspected was close on the banks of the canal, and was placed there for the convenience of the farmers, who brought their leaves in boats from the surrounding country, as well as to be near the water, a large quantity of which was requisite in the manufacture. It consisted of a number of round tanks, which are built for the purpose of steeping the leaves. The leaves are thrown into the tanks and covered with water, and, after remaining for a certain length of time, the juice is drawn off into other tanks, where I believe it is mixed with lime. The colour of the liquid at first is a kind of greenish blue, but after being well stirred up and exposed to the air it becomes much darker and very like the well-known indigo of commerce. I suppose it is thickened afterwards by evaporation in some way, but that part of the process did not come under my observation.

I am very much inclined to believe that this is the dye used to colour the green teas which are manufactured in the north of China for the English and American markets ; this, however, is only conjecture.

The plant has a half-shrubby stem covered with a fine bloom. Its root-leaves are oval-lanceolate, on long stalks, sharp pointed, slightly toothed, and somewhat fleshy ; those on the upper part of the stem, near the flowers, are linear. The stem is decumbent, a foot and a half long, and divided at its extremity into several drooping racemes about 6 inches long ; on its sides it bears here and there small clusters of leaves like those of the root. Flowers very small, yellow. Silicles black, quite smooth, 6 lines long by 2 wide in the broadest part, oblong, obtuse at each end, a little contracted below the middle, with a thin edge and a single median line.

It seems to be a new species of *Isatis*, perfectly distinct from all previously discovered. It belongs to the *Glastum* division, or true Woads, among which its dwarf, half-shrubby habit and acute, lanceolate, long-stalked leaves are conspicuous. I propose to call it *Isatis indigotica*, and to distinguish it by the following technical character :—*Isatis (Glastum) indigotica*; suffruticosa, foliis radicalibus glaucis ovali-lanceolatis latitudine ter longioribus obsoletè dentatis, caulinis linearibus silieulis linearibus glabris stigmate sessili coronatis medio paululum constrictis et basi angustioribus.



The Tein-ching, or Chinese Indigo (*Isatis indigotica*).

XLII.—*A description of the Stanwick Nectarine.* By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden.

FRUIT of this new and extraordinary production was received August 29, 1846, from the Right Hon. Lord Prudhoe, in whose garden at Stanwick Park it had ripened. His Lordship obtained the variety from stones given him by Mr. Barker, formerly Her Majesty's Vice-Consul at Aleppo, and now residing near Suedia, or Souadiah, in Syria, whose favourable climate is peculiarly suitable for the cultivation of Asiatic and European fruits. A year or two since Mr. Barker brought to this country, amongst other things, peaches and nectarines with sweet kernels. Such varieties were previously unknown in Europe, and were probably never heard of till their existence was announced by Mr. Barker.

The Nectarine forming the subject of this notice is about the size of an Elrudge, and like it in shape, except in being less heart-shaped at the base. Its skin is pale, like that of the White Nectarine, where shaded, with a violet tinge next the sun. The flesh is white, exceedingly tender, juicy, rich, and sugary, without the slightest trace of the flavour of prussic acid. The stone is middle-sized, ovate, with rather a prominent sharp edge, very rugged, and of a chocolate colour. The kernel is sweet, like a nut, possessing nothing of the bitter-almond flavour.

The fruit of the Peach and Nectarine, partaking so much as it does of the qualities of the bitter Almond, must have been very deleterious in its unimproved state. Mr. Knight, who himself succeeded in producing a melting Peach from an Almond, figured *Hort. Trans.*, vol. iii., p. 1, states that the *Tuberes* of Pliny must have been swollen Almonds, or imperfect peaches; and Duhamel has given an account of a fruit which accurately corresponds with this description, being sometimes produced by a variety of Almond-tree in France. Mr. Knight adds:—

“The bitterness, in this case, I conclude can only arise from the presence of the prussic acid; and as this acid, without being extracted by distillation, operates very injuriously upon many constitutions, some explanation appears to be given of the cause why the Peach was reported to possess deleterious qualities when it first came from Persia into the Roman empire.”

“*Stipantur calathi et pomis, que barbara Persis
Miserat (ut fama est) patruis armata venenis.*”

Columella, lib. 10.

The varieties of the Peach and Nectarine now generally cultivated retain but little of the injurious properties ascribed to the species by ancient authors; and, when well ripened, they can

be generally eaten with impunity, notwithstanding the slight prussic acid flavour which pervades even their luscious sugary juice ; but some constitutions are liable to be affected by this trace. It was indeed considered unlikely that amelioration would be carried much further. For at least a century little improvement has been effected, and in every variety the kernels have proved intensely bitter. But at last this is overcome ; in the specimen above described the deleterious quality considered inherent in the species has disappeared ; and Mr. Barker himself informed me that his fruits with sweet kernels may be eaten as a full meal, in quantities at any time of the day, and repeatedly, with perfect safety.

Mr. Crawford Baillie, gardener to Lord Prudhoe, has furnished the following additional memorandum concerning the Stanwick Nectarine :—

“ The Stanwick Nectarine was raised from seeds sown in March, 1843, and budded the same autumn on the Bellegard Peach. In 1845 a few flower-buds were produced near the ends of some of the strongest shoots, but the wood not being sufficiently ripe, they proved abortive.

“ The tree on its own roots is a strong and robust grower, and continues to grow late in autumn, and has hitherto retained its leaves throughout the winter. I have no doubt, however, that when worked upon Apricot, Plum, or Almond stocks, it will prove quite hardy, and bear well, even in the north of England.

“ I may mention that the Nectarine is fourteen days later than the peach upon which it was worked.”

XLIII.—Contributions to a History of the Relation between Climate and Vegetation in various parts of the Globe.

No. 2.—The Vegetation of the Organ Mountains of Brazil.

By George Gardner, Esq., F.L.S., Director of the Royal Botanic Garden, Ceylon.

THE Organ Mountains are situated to the north of Rio de Janeiro, and about 63 miles distant. They rise to the height of about 7000 feet, and take their name from a fancied resemblance which their peaks have to the tubes of an organ when seen from a distance. As the bay of Rio runs from south to north about 20 miles, this part of the journey to the mountains is always made by water, and the sail is a very pleasant one ; the bay being studded with many little verdant islands. The journey from the landing place to the foot of the mountains leads through a flat, partly sandy and partly swampy country. The sandy

parts are covered with low trees and shrubs, principally consisting of *Melastomads*, *Mallow-worts*, *Myrtle-blooms*, and *Solanums*, together with great abundance of *Schinus terebinthifolius*. In the hedges by the road-side I saw several species of *Cissus*, *Bignonia*, *Paulinia*, &c., and in moist places abundance of *Dichorizandra thyrsiflora* in beautiful flower. The sandy fields were full of a large species of *Cereus*, among which many plants of *Fourcroya gigantea* were to be seen throwing up their flowering stems to the height of from 30 to 40 feet. In the small streams and marshes are to be found some curious, as well as beautiful, aquatic plants. Among these may be mentioned a large white water-lily (*Nymphaea ampla?* D.C.), a fine *Pontederia* with large blue flowers, *Cabomba dentata*, (Gardn.,) &c. The marshy grounds are in general covered with thick forests of small trees, the most common of which is a simple-leaved, white flowered *Bignonia*. On the stems of these trees grew three species of *Orchideous* plants in great plenty; one of these is the lovely *Cattleya Loddigesii*, Lindl., the second *Oncidium flexuosum*, the stems of which are often 6 feet high, and full of blossoms. The third is a species of *Burlingtonia*. The whole ascent of the mountains to the Fazenda, or farm, at which I took up my residence for several months, and which stands at an elevation of upwards of 3000 feet, is covered with a dense wood. The magnificence of these forests can scarcely be imagined by those who have not seen them and penetrated into their recesses. The remnants of virgin forests which still exist in the neighbourhood of the capital, although they appear grand to the eye of the newly arrived European, become insignificant when compared with the mass of giant vegetation that clothes the sides of the Organ Mountains. Many of these trees are of immense size, their trunks and branches covered with myriads of Epiphytes, consisting of *Orchids*, *Bromeliads*, *Ferns*, *Arads*, *Peppers*, &c. A great proportion of the largest of these trees I afterwards found to be species of *Ficus*, *Myrtles*, *Laurus*, *Melastomads*, and *Leguminous* plants. Many of them have their trunks encircled by twiners, the stems of which are often thicker than those they surround. This is particularly the case with a species of *Ficus*, called by the Brazilians *Cipo Matador*. It runs straight up the tree to which it has attached itself, but at the distance of about every 10 feet it throws out from each side a thick clasper, which curves round, and closely entwines the other stem. As both the trees increase in size, the pressure ultimately becomes so great that the supporting one dies from the embrace of the parasite. At the lower part of the mountains the underwood consists principally of shrubs belonging to the natural orders *Melastomads*, *Myrtle-blooms*, *Composites*, *Cin-*

chonads, among which grow many large species of herbaceous ferns, and several Palms. About the middle Palms and tree-ferns abound: some of the latter, which are mostly *Alsophilas* and *Cyatheas*, reaching to the height of from 30 to 40 feet. At an elevation of about 2000 feet a large species of Bamboo (*Bambusa Tagoara*, Mart.) mingles with the forest trees in great profusion. The stems of this gigantic grass are often 18 inches in circumference, and attain to a height of from 50 to 60 feet. They never, however, grow perfectly upright, the tops of them curving gradually down till they sometimes nearly reach the ground.

The Fazenda at which I resided during my stay in the mountains, belongs to Mr. March, an Englishman. His estate embraces an extent of country which contains some 64 square miles, and is principally intended for the breeding of horses. The greater part of it is still covered with virgin forest, that which is cleared consisting of pasture-land and several small farms for the cultivation of *Indian corn*, *French beans*, and *potatoes*. Plentiful crops are yielded by the two former, but the produce of the latter is neither so abundant nor so good as it is in England. He likewise possesses a large garden, which is under the management of a French gardener. In it may be seen nearly all the European fruits and vegetables growing in the greatest perfection. The *Peach*, the *Olive*, the *Fig*, the *Vine*, the *Apple*, the *Pear*, the *Orange*, all produce fruit more or less abundantly. The *Strawberry* yields but little, and the *Gooseberry* no fruit at all. Excellent crops of *Cauliflower*, *Cabbage*, *Asparagus*, *Artichokes*, *Celery*, *Turnips*, *Carrots*, *Pease*, *Onions*, &c., are freely produced and sent weekly to the city market. At this elevation the climate is very much cooler than it is at Rio. In the months of May and June the thermometer has been known to be as low as 32° just before daybreak; the lowest at which I observed it myself was one morning at the end of May, when at 8 o'clock A.M. it indicated 39°. The highest to which it rose during the six months I resided there was in the end of February, when one day it indicated 84° at noon. The hot season is also the season of rains, and it is then that the mass of the *Orchids*, and almost every other tribe of plants, come into flower. From these facts cultivators ought to take a lesson in the cultivation of the productions of this and of similar regions. If the difference of temperature between the season of wet and that of flowering be so great in the state of nature, it must be obvious, that to grow them well artificially, a somewhat similar state of things ought to be observed. The greater part of the *Orchids* which are sent to England from the Organ Mountains grow in the region of the above temperature,

the elevation being from 3000 to 3500 feet above the level of the sea. In the account which I shall presently give of my visit to the summit of those mountains, which is more than double that elevation, I shall have occasion to mention several species which may be cultivated in a much cooler temperature. Another reason why no general rule can be laid down for the cultivation of these plants is, the great variety of soil and situation which they affect in their native country; some, like *Zygopetalum Mackaii*, are terrestrial, and grow in open exposed places; others, like *Warrea tricolor*, are also terrestrial, but grow in the deep virgin forests; some, like *Zygopetalum maxillare*, are only found to inhabit a particular tree, while others are found indiscriminately on all kinds of trees, on rocks, and even on the ground; some, like *Laelia cinnabarinata*, grow in moist places on exposed rocks; while others, like *Cystopera Woodfordii*, grow in a similar soil, but in shaded places; some, like *Maxillaria picta*, grow on the most dry and exposed rocks, while others, like *Grobya Amherstiae*, grow also on dry rocks, but generally in the shade. The soil is here very similar to that around Rio, there being but little alluvium, except in the valleys, and the under stratum consisting of the same red-coloured argillaceous-ferruginous clay. Like the mountains around Rio, the whole of the Organ range consists of granite.

As I arrived on the mountains when the summer was setting in, I was just in time to secure the first flowers of the season; and as my excursions extended in all directions to a distance of from 10 to 20 miles from Mr. March's house, I was enabled to obtain a tolerably correct knowledge of the vegetable productions of that part of the country. In the following short sketch I shall merely mention what are the most common plants which are peculiar to a few well-marked situations. In moist and marshy places the shrubby vegetation consists of *Melastomads*, some of which are beautiful large flowers, species of *Pleroma*, that rival the Rhododendrons in the richness of their colours. Among these are also to be seen a few species of *Myrtle-blooms*, and several fruticose and suffruticose species of *Vernonia*. The herbaceous plants consist of *Composites*, the most common of which is a large white-flowered *Erigeron*, several *Utricularias*, *Drosera villosa*, different species of *Ferns*, one of which is the fine *Osmunda spectabilis*, many species of *Begonia*, *Sedges*, *Grasses*, and terrestrial *Orchids*. In the pastures the turf consists of different species of *Grass*, which belong principally to the genera *Paspalum*, *Panicum*, *Chloris*, &c.; but it is with no little difficulty that the pastures can be kept from running into a mass of shrubs and underwood, from the rapidity with which plants of those characters usurp the soil. Hence all

the pastures which exist on the Organ Mountains are artificial. The shrubs which spring up most commonly are various species of *Melastomads*, *Myrtle-blooms*, *Croton*, *Cinchonads*, *Leguminosæ*, *Solanum*, *Ardisiads*, *Samyds*, *Vismeia*, *Lantana*, *Mallow-worts*, &c. The suffruticose and herbaceous plants, which are to be met with in greatest abundance in pasture lands, consist of numerous kinds of *Composites*, embracing species of *Vernonia*, *Eupatorium*, *Baccharis*, &c.; a few of *Hyptis*, *Peltodon*, *Cinchonads*, and *Ferns*: of the latter *Pteris caudata* is by far the most common as well as the most troublesome. In *cultivated lands* the plants most commonly met with are a species of *Phytolacca*, *Sonchus oleraceus*, *Tagetes minuta*, different species of *Capsicum*, *Ageratum conyzoides*, a repent species of *Polygonum*, *Chenopods*, *Richardsonia scabra*, *Stellaria media*, &c. In places which have been cleared and afterwards allowed to run to waste, called *Capoeras* by the *Brazilians*, the plants which spring up are of quite a different character from those which originally grew there. They consist principally of several species of *Pleroma* and other plants belonging to the natural order of *Melastomads*, an arboreous *Vernonia*, and species of *Inga*, *Cassia*, *Solanum*, *Croton*, *Myrsine*, *Ægiphila*, *Myrtle-blooms*, *Lantana*, *Cerasus*, *Rubus*, *Clethra*, *Cestrum*, and particularly by the sides of streams, *Datura arborea*. Among these grow many herbaceous plants, and climbing species of *Composites* and *Leguminosæ*, with occasionally *Fuchsia integrifolia*. *Ilex Paraguayensis*, the leaves of which form the celebrated *Paraguay tea*, is also found sparingly in such situations. Where the ground is rather swampy, a fine species of *Talauma* (*T. fragrantissima*, Hook) is not unfrequent; it forms a tree from 15 to 40 feet high, and its large green leaves and large pale yellow flowers render it one of the most striking trees I have ever met with. The flowers are highly odoriferous, and a single tree may be discovered by the sense of smell alone at a distance of more than half a mile when the wind blows in the direction from it. Several species of *Laurus* are also found in similar situations.

The trees of the *virgin forests*, so far as I was able to ascertain, consist for the most part of numerous species of *Palms*, *Laurus*, *Ficus*, *Cassia*, *Bignonia*, and *Solanum*. *Chorisia speciosa*, St. Hil., and many *Myrtaceous* trees also abound in the dense forest. Among the latter I found three species of *Campomanesia*, one of which (*C. hirsuta*, Gardn.) produces a large fleshy fruit which is very acid, and is used by the English residents to make gooseberry-fool of. The various species of *Laurus* are fine large trees, and, both in regard to habit and the formation of their fruit, they remind the European of the oaks

of his native country. They flower in the months of April and May, at which season the atmosphere around them is loaded with the rich perfume of their small white flowers. When their fruit is ripe, it forms the principal food of the *Jacutinga* (*Penelope Jacutinga*, Spix.), a fine large game bird. Some of the very largest trees of the forest are species of *Ficus*, one of which, with an enormous height and thickness of stem, is called by the English the *buttress-tree*, from several large thin plates which stand out from the bottom of the stem like buttresses. They begin to jut out from the stem at the height of from 10 to 14 feet from the bottom, and gradually increase in breadth till they reach the ground, when they are connected with the large roots of the tree. At the ground these plants are often 5 feet broad, and little more than half a foot in thickness. The large *Cassias* have a fine appearance when in flower, and as almost an equal number of *Pleroma Fontanesianum*, and other trees belonging to the same natural order (*Melastomads*) are in flower at the same time, the forests are then almost one mass of yellow and purple from the abundance of such trees. Rising amid these, the large pink-coloured flowers of *Chorisia speciosa*, St. Hil., can be easily distinguished. This is a large tree, with a stem covered with strong prickles, about 6 feet in circumference, unbranched to the height of from 40 to 50 feet. The branches then form a nearly hemispherical top, which, when covered with thousands of its beautiful large blossoms, has a striking effect as contrasted with the masses of green, yellow, and purple, of the surrounding trees. Many of these large trunks afford support to various species of climbing and twining shrubers belonging to the natural orders *Bignoniads*, *Composites*, *Dogbanes*, *Leguminosæ*, *Menispermads*, &c. The stems of these climbers often assume a very remarkable appearance, several of them are often twisted together, and dangle from the boughs of the trees like ropes, while others are flat and compressed like belts; one of these, a species of *Mimosa*, I have often seen more than 6 inches broad, and not more than an inch thick. Two of the finest of the climbers are the beautiful large-flowered *Solandra grandiflora*, which, diffusing itself among the branches of the largest trees of the forest, gives them a magnificence not their own; and *Fuchsia integrifolia*, which is very common, attaching itself to all kinds of trees, and often reaching to a height of from 40 to 100 feet. Since my first visit to the Organ Mountains this plant has been introduced to the gardens of England by my friend Mr. Miers, but there it does not seem to flower so freely as in its native woods. Perhaps this may arise from letting it have too much heat. That it will stand a great deal of cold is obvious from the fact that I found it inhabiting every region from 3000

feet of elevation to the very summit of the mountains, where, indeed, in the shape of a stunted procumbent rooting plant, growing in the cleft of a rock, it forms the most elevated flowering form on the range, and produces its blossoms abundantly.

The shrubs which are found in the virgin forests consist principally of numerous species of *Cinchonads*, *Myrtle-blooms*, *Melastomads*, *Gomphias*, *Palms*, *Arborescent Ferns*, *Francisca ramosissima*, Pohl., and the splendid *F. hydrangeiformis*, Pohl., of which I succeeded in bringing home two plants alive, one of which is now growing vigorously in the Royal Gardens at Kew; and *Cybianthus angustifolius*, Alph. D. C., which is very common. The herbaceous plants peculiar to the virgin forests are not unfrequently very abundant in individuals, but not so much so in species. They consist of a great profusion of *Ferns*, suffruticose and herbaceous species of *Begonia*, some of them with very large foliage, and rising to the height of 12 and 15 feet. The finest of these is the *Begonia digitata*, which rises very high, has large digitate leaves, and large panicles of small white flowers. This I have also introduced to England. In dry rocky places *Bromeliads*, *Orchids*, and *Dorstenias* prevail, mixed with suffruticose and tuberous rooted species of *Gesneriads*. *Epiphyllum truncatum* is very common, growing on rocks, but more frequently on the trunks of large trees. Many of the finest of the ferns found in the virgin forests grow also on the stems of trees; this is the case with many species of *Acrostichum*, *Asplenium*, *Polypodium*, *Pleopeltis*; and some small species of *Asplenium*, *Polypodium*, *Trichomanes*, and *Hymenophyllum*, are never found but on the stems of tree-ferns. *Hippeastrum calypratum* and *psittacinum* are both common in these woods.

Such is a slight sketch of the vegetation of the Organ Mountains at about an elevation of 3000 feet. What follows is the result of several journeys which I made to the upper regions of the range, the highest part of which, determined by the boiling point of water, I found to be 6857 feet. Several botanists had visited Mr. March's estate before me, such as Langsdorff, his assistant Riedel, Burchell, and Lhotsky, but none of them remained more than a week or two, and none of them botanized at a greater elevation than Mr. March's house. This fact made me the more anxious to spend a few days among the high peaks, where I felt certain of meeting with quite a different kind of vegetation. Before reaching the steeper part of the ascent, I had to pass for several hours through the dense and sombre virgin forest, where I met with many fine species of *Ferns*, *Orchids*, and *Begonias*. In crossing over a high hill, I found the low trees on the top of it literally covered with various kinds of

Orchids, but with the exception of the beautiful little *Sophronitis grandiflora*, nothing new to me occurred among them. Several large plants of *Oncidium divaricatum*, a *Maxillaria*, and some small *Epidendrums*, were also found in flower. It was here that I first met with the lovely *Luxemburgia ciliosa*, a fine shrub producing large corymbs of lemon-coloured flowers. This I afterwards introduced to England, where it has flowered, both at Glasgow and Kew. On this hill I observed two species of Bamboo, different from the large one in the woods below, both being much smaller, but neither of them were in flower. The getting through these was one of the most difficult parts of the journey.

The first night was spent by the side of a little stream at the foot of the steep ascent, a beautiful spot, and one near which I found many fine plants. The first that attracted my attention was what I then imagined to be a fine individual of *Epiphyllum truncatum*, in full flower, hanging from the trunk of a large tree that was bent over the stream. As I wanted to add a few specimens of it to my collection, I soon managed to put myself in possession of the whole plant, when, to my surprise and delight, I found it to be a new species. I have named it *E. Russellianum*, in honour of his Grace the late Duke of Bedford; and living plants which I then sent home are now in the gardens of England; but nowhere have I seen it well-grown. It will most assuredly never succeed in the dry heat in which the mass of the Cactus tribe grows so well. In its native country it grows in a much cooler region than its congener, *E. truncatum*. During my several journeys to and from the upper parts of the range, I always found the latter species confined to the dense virgin forests below the elevation of 4500 feet; while, from that point to upwards of 6000 feet, the former alone was always seen, either attaching itself to the stems of trees, or to the faces of shaded rocks, and flowering when the thermometer falls sometimes at daybreak to 42°. Further up the stream, by the side of a small waterfall, and on a moist slanting bank near it grew great quantities of a fine, large, dark, red flowered Amaryllid (*Hippeastrum Organense*, Herb.), which, from roots then collected, I was the first to introduce to England. By the side of the fall there were some bushes of a large-flowered species of *Pleroma*, the branches of which were festooned with the climbing Fuchsia, covered with its crimson flowers, a red-flowered *Esterhazia*, and a large-leaved species of *Clusia* (*C. fragrans*, Gardn.), which loaded the atmosphere with the powerful odour of its large white blossoms. Beneath these grew the Amaryllid, a large entire-leaved *Eryngium*, several *Bromeliads*, and numerous herbaceous Ferns. On a shelving granite rock above

the fall there grew abundantly the lovely *Zygopetalum Mackiae*, the odoriferous *Maxillaria picta*, and *Grobya Amherstiae*, with its onion-like pseudo-bulbs. Early next morning the ascent was continued. On the slope above the fall, but at a greater elevation than I had attained the night before, I collected in moist places an *Eriocaulon*, *Drosera villosa*, A. St. Hil., *Burmannia bicolor*, Mart., a pretty little Gentianaceous plant forming a new genus (*Hockinia montana*, Gardn.), *Cleistes montana*, Gardn., *Luxemburgia ciliosa*, Gardn., a white-flowered *Chabréa*, a large *Senecio*, and a tall purple-flowered *Lobelia*. In passing through a wood above this I found plenty of my new *Epiphyllum*, several fine *Begonias*, *Gesneras*, and ferns. Emerging from this wood, another steep ascent was again encountered, almost entirely covered with a large Bromeliaceous plant, above which rose a few fine shrubs, such as a very handsome scarlet-flowered *Salvia*, *S. Benthamiana*, Gardn., *Rondeletia longiflora*, Cham. et Schl., a pale rose-blossomed *Gerardia*, and several *Vernonias* and *Eupatoriums*. Here also I found a magnificent suffruticose plant belonging to the natural order of *Gentians*, which proved to be a new species of Martius' new genus *Prepusa* (*Prepusa connata*, Gardn. in Hook. ic. plant). Passing this place we again entered a wooded tract, where I found abundance of *Promenea xanthina*, Lindl., a few plants of *Oncidium Forbesii*, and a tall yellow-flowered *Senecio*. Leaving this place, an open slanting boggy tract was gained, in which I met with several new ferns, such as a tall, shrubby, Proteaceous-like species of *Baccharis* (*B. platypoda*, D. C.). a *Vaccinium*, and an *Andromeda*, both in fruit, a *Pleroma*, a variety of *Lavoisiera imbricata*, D. C., a *Utricularia* with fine purple flowers, and large cordate leaves borne upon long petioles, a shrubby *Hyptis*, and a *Salvia* with small purple flowers. We were now at an elevation of about 5000 feet. On an open rocky place a little further up grew great masses of a low gregarious species of *Vellozia*, which unfortunately was just out of flower, and along with it a few small *Melastomaceous* shrubs that were new to me, several new fruticose *Composites*, and a small *Gaylussacia*. Among these I found *Siphocampylus duploserratus*, Pohl., and *S. longipedunculatus*, Pohl., together with two climbing species of *Valerian*, a *Ternstræmia*, a very small-leaved *Ilex*, a *Laurus*, two species of *Rhopala*, *Gaultheria ferruginea*, Cham. et Schl., a *Weinmannia*, and a *Flotovia*. The greatest elevation which I attained at this time was about 6000 feet, but on another visit which I made to these mountains after my return from the interior, I succeeded in reaching the summit, and remained there nearly a week enriching my collections with

many new species of plants. The following is an account of that excursion.

On the journey to the place which I had formerly reached I met not only with nearly all the plants which were then collected, but with many new ones. Among these may be mentioned a *Vochysia* forming a small tree, every branch of which terminates in a long spike of bright yellow flowers, a new *Fuchsia* (*F. alpestris*, Gardn.) similar in habit to *F. integrifolia*, but a very different species, and which I was enabled to introduce alive to England; two new fruticose species of *Gesnera*, a most magnificent *Melastomaceous* tree, which is perhaps a new species of *Davya*. It forms a large tree, and the top of it when cut down was literally one mass of large pink-coloured flowers. It was with sorrow that I gave orders for such a noble denizen of the forest to be destroyed, but specimens were not to be obtained otherwise. I also met with abundance of the beautiful *Luxemburgia ciliosa*, both in flower and fruit, an *Helosis*, an *Apteris*, and a few *Ferns*, among which was the *Asplenium alatum*, Humb. But perhaps one of the most remarkable of my discoveries, on the ground which I had previously gone over, was a very extraordinary species of *Utricularia*. Since my return to England it has been published by me in Hooker's *Icones Plantarum*, under the name of *U. Nelumbifolia*, and there a very excellent figure of it is given. Like most of its congeners it is aquatic; but what is most curious, it is only to be met with growing in the water which collects in the bottom of the leaves of a large *Tillandsia* that inhabits abundantly an arid rocky part of the mountain at an elevation of about 5000 feet above the level of the sea. Its leaves are borne upon petioles upwards of a foot long, are peltate, and upwards of three inches in diameter. The flowering scape is about two feet long, and bears at its extremity about half a dozen large purple flowers. Besides the ordinary method of seed, it propagates itself by runners, which it throws out from the base of the scape. These runners are always found directing themselves towards the nearest *Tillandsia*, where they insert their point into the water, which gives origin to a new plant, which, in its turn, sends out another shoot. In this manner I have seen not less than six plants united to each other.

The peak, which on my previous visit to these mountains I had supposed to be the highest, was now ascended by a path which had been made a short time before by Mr. Lobb, an English gardener, who had been sent out by a nurseryman to collect living plants and seeds. Starting from the point I had previously gained, we made a descent into a wooded ravine full of

Alstroemeria nemorosa, Gardn., *Fuchsia integrifolia*, and many beautiful Ferns and *Melastomads*; and after ascending again for some time through a well wooded tract, the stems of the trees in which we found to be covered with the beautiful *Ephyllum Russellianum*, we entered upon a steeper portion of the mountain covered with large shrubs. These I found to consist of *Melastomads*, fruticose *Composites*, *Vacciniums*, a *Weinmannia*, a *Gaultheria*, and great abundance of a new and beautiful *Escallonia* (*E. Organensis*, Gardn.), with rose-coloured blossoms. The summit of this peak consists of several enormous loose blocks of granite, covered with *Lichens*, small species of *Orchids*, *Gesneras*; and where there is a little accumulation of soil, *Hippeastrum Organense*. Here, also, as I have already stated, small plants of *Fuchsia integrifolia* grow on the nearly bare rocks. Besides the plants already enumerated, I added the following to my collections on this ascent. A beautiful tree-fern, from six to ten feet high, growing in the wooded ravine, which since my return to England I find to be perfectly identical with the tree-fern of the Cape of Good Hope, *Hemitelia capensis*, R. Br., which is a remarkable fact in the geographical distribution of the tribe to which it belongs, as tree-ferns are much less widely distributed than the smaller herbaceous ones. In an open spot at a greater elevation grows abundance of a species of *Lomaria*, with a thick stem about three feet high, and large pinnated leaves, which gives it very much the appearance of a *Zamia*. This also seems to be a plant common to the Cape and Brazil. Along with this fern, but in a still more open locality, where the soil is peaty and moist, grows in very large patches another fine species of *Prepusa* (*P. Hookeriana*, Gardn.), a figure of which has lately been published in the 'Botanical Magazine.' It is an herbaceous plant, which throws up a stem about a foot and a half high, bearing from three to six flowers, the large inflated calyces of which, together with the stem, are of a deep crimson colour. In dry places on the summit there is great plenty of a pretty procumbent suffruticose *Cinchonaceous* plant with small blue flowers; an *Oxalis*, several *Vacciniums*, a procumbent *Gaultheria*, perhaps *G. elliptica*, two or three species of *Hypericum* and *Habenaria*. In bushy shady places I found *Drymis Granatensis*, an *Hydrocotyle*, a small *Eriocaulon*, several *Mosses*, *Lichens*, and a number of pretty little ferns. Several *Composites* also rewarded my researches, among which I may mention a fine *Flotovia*, two or three species of *Senecio*, an *Erigeron*, and a very handsome herbaceous plant, about four feet high, with a woolly stem, and leaves which are large, and not unlike those of a *Verbascum*. It produces a large loose panicle of orange-coloured flowers, and belongs to

the *Mutisia* tribe. As it proved to belong to a new genus, I have named it in commemoration of my late lamented friend, J. E. Bowman, Esq., of Manchester. This peak was found to be exceeded in height by another about a mile distant, and setting out to ascend it, we passed through a beautiful little wooded valley with a stream of cool and limpid water running in the middle of it. Leaving this, and entering upon an open flat marshy tract, the greater part of which is covered with a tall coarse grass, about five feet high, growing in tufts about two feet asunder, I met with some new plants. In rather elevated tracts covered with *Sphagnum*, grew abundance of a little shrub belonging to the *Mutisia* tribe of *Compositae*, and which has much the habit of some of the smaller *Lychnophoras*. This, which was also a new genus, I have since published in Hooker's 'Journal of Botany,' under the name of *Leucopholis phylioides*. Here also I found plenty of *Drosera villosa*, St. Hil., a pretty little *Utricularia*, with large purple flowers, and a slender narrow-leaved species of *Hypericum*. Leaving this, we entered another wooded tract, but composed of trees of a much smaller size than those met with in the little valley, in passing through which are the tracks of *Tapirs*; I was rather surprised to observe that while almost every tree had its stem and branches covered with the beautiful little *Sophronitis grandiflora*, not another Orchideous plant was to be found. All that this tract afforded me besides were a few ferns, a fine large *Bryum* (*B. Beyrichianum*), a *Daphne*? and one or two shrubs which I have not yet determined. Beyond this there is no more wood, the vegetation consisting of stunted shrubs belonging to *Compositae*, the *Escallonia* before mentioned, a few *Vacciniums*, *Gaultherias*; and a few herbaceous plants, such as a fine *Barbacenia* with long red flowers, a curious *Sisyrinchium* (*S. incurvatum*, Gardn.), two handsome species of *Senecio*, a few terrestrial *Orchids*, &c. The summit itself, which consists of one great flat rounded mass of granite, bears a few little shrubs and herbaceous plants. Among the latter, the most abundant is the beautiful *Prepusa Hookeriana*. In a shallow shaded ravine, *Escallonia Organensis* grew abundantly, and was in full flower.

On my second visit to the Organ Mountains, I made an excursion inland to the banks of the Rio de Parahyba, and returned by way of Canta Gallo, and the Swiss colony of Novo Friburgo. From the trees in the large forests on the banks of the river, I obtained many fine Orchideous plants, among which were a few of *Huntleya Meleagris*. This journey also afforded many ferns and other plants, which very much enriched my Herbarium.

The following plants, which from their beauty are well adapted

for cultivation, still remain to be introduced to our Gardens from the Organ Mountains.

1. *Prepusa connata*, Gardn.
 2. *Prepusa Hookeriana*, Gardn.—Both of these species were introduced alive by me to England, but were soon lost. They are both beautiful plants, belonging to the natural order of *Gentians*. They will only succeed in the greenhouse in a peaty soil kept moist, but at the same time well drained.
 3. *Salvia Benthamiana*, Gardn.—A fine shrub about three feet high, with nearly orbicular leaves, and large scarlet flowers.
 4. *Salvia rivularis*, Gardn.—Suffruticose, and about four feet high. Flowers large and scarlet.
 5. *Escallonia organensis*, Gardn.—A very handsome shrub, about four feet high, producing dense panicles of rose-coloured flowers.
 6. *Bowmannia verbascifolia*, Gardn.—A fine herbaceous plant about four feet high, with a large loose panicle of orange flowers, belonging to the *Mutisia* group of Composites.
 7. *Lavoisiera imbricata*, D. C.—This is one of the beautiful Melastomaceous shrubs, with small leaves and large flowers, which are so common in the Gold and Diamond districts of Brazil. It grows naturally gregariously in a moist peaty soil.
 8. *Siphocampylus duploserratus*, Pohl.—A fine subscandent species, with large flowers.
 9. *Naposanthus brasiliensis*, Gardn.—A fine little suffruticose plant, belonging to the Cyrtandreas division of Gesnerads, and remarkable as being one of the only two plants belonging to this tribe that are natives of the American continent. In appearance it is not unlike a species of *Streptocarpus*.
 10. *Citrosma oboratum*, Gardn.—A small shrub, worthy of being introduced, not only as a botanical curiosity, but for the rich lemon odour of all its parts.
 11. *Talauma fragrantissima*, Hook.—A fine large tree belonging to the natural Order of *Magnoliads*. The flowers are large, pale-yellow, and powerfully odoriferous. It grows naturally in moist swampy places, and not unfrequently flowers when not more than ten or twelve feet high.
 12. *Passiflora speciosa*, Gardn.—A climber, with large scarlet flowers from four to six inches in diameter.
- There are besides these, many fine *Composites*, *Cinchonads*, *Myrtle-blooms*, *Melastomads* particularly *Pleromas*, *Bignoniads*, *Begoniads*, *Ferns*, &c., well deserving the attention of cultivators. The first eight species of this list grew at such an elevation as to entitle them to be considered greenhouse plants.

No. 3.—*The Vegetation of Bahia and Pernambuco.* By George Gardner, Esq., F.L.S., Director of the Royal Botanic Garden, Ceylon.

As the packet in which I took my passage from Rio to Pernambuco only remained two days at BAHIA, my excursions did not extend far beyond the immediate neighbourhood of the city. The country is very flat compared with that around Rio, but the soil is very much of the same nature. The vegetation is, however, rank and luxuriant. The shores are covered with large plantations of Cocoa-nut trees, and the higher grounds are well planted with Mango, Jack, and other fruit trees, all of which attain to a much greater size than they do at Rio. After visiting a convent at the west end of the city, the nuns in which make for sale artificial flowers from the feathers of birds, I hired a boat to go up the bay a few miles on a botanical excursion. I landed on a peninsula called Bom Fim, and set out with one of the blacks to walk across it, a distance of about two miles. On the shore I observed some plants of *Sophora tomentosa*, *Argemone mexicana*, *Eugenia Michelii*, and a large spiny shrub belonging to the natural order of *Rhamnads*. In a moist sandy place in a marsh a little inland, *Spennera aquatica* and another little Melastomaceous shrub grew very abundantly, as also *Sauvagesia erecta*, and a pretty little *Eriocaulon*. In dryer sandy places beyond this grew a very minute species of *Eriocaulon*, and a pretty dwarf shrubby species of *Cuphea* (*C. flava* Spreng.), with small leaves and bright yellow flowers. By the road side *Ampherephis aristata*, Kunth—a very pretty species of Composite, and the prickly fruited *Acanthospermum hispidum*, D. C., were very common. In some small pools in a marshy place under the shade of some large palm-trees, I collected fine specimens of the curious *Pistia Stratiotes*, both in flower and in seed. It was floating on the surface of the water along with *Limnanthemum Humboldtianum*. After reaching the shore on the opposite side of the peninsula, I walked along it a little way, but without finding any thing new. In muddy salt marshes here, as on the shores at Rio, *Rhizophora Mangle*, *Avicennia tomentosa*, *Laguncularia racemosa*, and *Conocarpus erectus*, were very abundant, and the latter I had not met with before in flower. We returned to the boat by a different road, and I was glad that we did so, as otherwise I would have missed one of the finest plants which my collection from this place boasts of. This was the beautiful *Angelonia hirta*, Cham., which I found but sparingly in a swampy place at the foot of a hill on which a large church is situated. It produces long spikes of light-blue flowers, and is not unlike another species (*A. bi-*

flora, Benth.) which I have since introduced to England. This was the only plant I found near Bahia, not already in cultivation, worthy the attention of cultivators. Near the same place an annual species of *Cuphea*, with large purple flowers, grew very abundantly. Along this road I observed some very large Mango trees. When growing alone this tree has a magnificent appearance; more so, indeed, than almost any other I have seen. The stem, which is often of great thickness, seldom rises above 8 or 10 feet before it branches; but those rise to a great height, at the same time that they spread out widely, and are so densely covered with their dark-green shining leaves, that they form an impenetrable shade to the burning rays of the sun. The Jack tree (*Artocarpus integrifolia*) is also a very large one, and at this season it was in fruit, which, of enormous size, was hanging from the trunk and large boughs. On the branches of these trees, as well as on the stems of the Cocoa-nut and other large Palms, I obtained some fine plants of *Coryanthes speciosa*. I regret much that my time did not permit me to go some distance into the country, particularly on account of the *Orchids* and *Ferns* which are no doubt abundant in the forests.

A residence of several months in the province of PERNAMBUCO enabled me to obtain large collections of its vegetable productions, and consequently a pretty accurate knowledge of its general vegetation. The country is still flatter than it is about Bahia, so much so that as we made the coast the houses and Cocoa-nut trees stood out in relief above the horizon, and the soil is generally sandy. For the first few days my walks extended but little beyond the suburbs of the town, and as the dry season had commenced, the herbaceous vegetation on the more exposed situations was beginning to suffer for want of rain. For many miles round the town the Cocoa-nut and other large Palms grew in the greatest profusion, mixed with fine trees of the Cashew (*Anacardium occidentale*), which was then covered with its yellow or reddish coloured fruit; with *Mangos* (*Mangifera Indica*), which here attain a much larger size than they do at Rio, though still far from equalling those of *Bahia*; and the two species of Bread-fruit (*Artocarpus incisa*, and *integrifolia*), the ends of the branches in the former, and the trunks and main boughs of the latter, supporting their monstrous fruits. More attention seems to be paid here than at Rio to the gardens which are attached to the houses near the town, many of them being adorned with beautiful flowering shrubs principally of Indian origin.

During my first walks I collected specimens of the following plants:—*Turnera trioniflora*, which grows profusely in waste and cultivated spots, and by road sides, even decorating

some of the less frequented streets of the town with its large pale yellow flowers, which only expand during the early part of the day ; and, in the same situations, the large flowered *Richardsonia grandiflora*, *Boerhaavia hirsuta*, and *Argemone mexicana*. In marshy places, which were beginning to be dried up, grew the beautiful *Pontederia paniculata*, *Hydrolea spinosa*, and a small purple flowered *Ammannia*. In spots which were either now under cultivation, or had once been so, grew *Elytraria tridentata*, a narrow-leaved *Stackytarpheta*, *Angelonia pubescens*, *Monnieria trifolia*, a small *Eriocaulon*, several small Leguminous plants, and *Conoclinium prasiifolium*, D. C. &c. Where the ground was dry, and among bushes, I observed *Hirtella coriacea* in great plenty and in full bloom, together with a small *Malpighia*, *Jatropha urens*, and another species allied to *J. gossypiiifolia*, which sometimes attains the stature of a tree, and is not unfrequently used for hedges. The *Mimosa* and other fences, as about Rio, are here festooned with *Malpighias*, *Bignoniias*, *Ipomæas*, and Leguminous plants ; among the latter the Cow-itch plant (*Stizolobium urens*) was the most abundant, and, mingled in many places with a large species of Dodder (*Cuscuta sp.*), which twines over the hedges with its long yellow cord-like branches, and gives them a withered-like appearance.

One day I walked to Olinda, the ancient capital, situated about a league to the north of the town of Pernambuco. The road is quite level, and much of it passes through waste and uncultivated land. A considerable portion of one side of it is bounded by a large fresh-water lake, and some of the others by *Mimosa* hedges, in which grew in the greatest profusion a small-leaved and small white-flowered *Jasmine*, which was delightfully fragrant, and a species of *Securidaca* covered with large clusters of rich purple flowers. The road-side was gay with the pale-yellow blossoms of *Turnera trioniflora*, and the delicate pink heads of a Sensitive plant. The lake was fringed along its margin with low shrubs, among which I observed *Anona palustris*, *Aricennia tomentosa* and *nitida*, *Laguncularia racemosa*, and a sub-arborescent kind of *Caladium*, while many parts of the water were yellow with the flowers of *Limnocharis Humboldtii*, and of a large species of *Utricularia*. Towards Olinda I was delighted at finding the surface of the water covered with thousands of the splendid white blossoms and broad floating leaves of the fine Water lily *Nymphaea ampla*, D. C. At Olinda there is a small provincial Botanic Garden, to the curator of which I carried a letter from the President of Pernambuco. The curator, Dr. Serpa, since dead, gave demonstrations on Botany to the students attending a law and theological Academy which exists at Olinda. I found him an intelligent old man.

He accompanied me in a walk round the garden, which contained but little worthy of notice; a few European plants struggling for existence, and some large Indian trees, being its chief productions: among the latter, however, were fine specimens of the *Mango*, *Tamarind*, and *Cinnamon*. It likewise contained a few fine palms, among which I observed some large fruit-bearing Dates. Although the town of Olinda is situated on a low hill, the country around it is flat, and the vegetation very similar to that around Pernambuco. One of the finest of the wild fruits of Brazil grows in this neighbourhood, and what is not a little remarkable, belongs to the natural order of *Dogbanes*. The tree which produces it is the *Hancornia speciosa*, reaching to the size of an ordinary apple-tree, though its small leaves and drooping branches give it more the appearance of the Weeping birch. The fruit which it bears is yellow, a little streaked with red on one side, about the size of an Orleans plum, and of delicious flavour. It is called *Mangaba* by the Brazilians, and when in season is brought in great quantities to Pernambuco for sale.

The months of November and December of 1838 I spent at the country-house of Dr. Loudon, a gentleman I had previously met with in Scotland, situated on the banks of a small river about four miles to the west of Pernambuco, and as the country around it was chiefly uncultivated, I had ample scope for my researches. In a low marshy spot near the house I met with a good many sedges and grasses, and great plenty of the curious *Pongatium indicum*, Lam. In the same marsh, as well as along the banks of the river, grew some fine large trees of *Aricennia nitida*, their stems often measuring 5 feet in circumference, and rising unbranched to a height of nearly 30 feet. Opposite the house, on the other side of the river, there extends a large tract of wooded country, consisting chiefly of small trees and shrubs, which have sprung up since the virgin forests have been felled: it is called the Matto de Torre. Between this wood and the river stretches a broad open stripe, partly covered with low shrubs, and partly grass and other herbaceous plants. The former consist of several species of *Solanum* and *Mimosa*, some *Myrtle-blooms*, *Vernonias*, *Jatropha urens*, &c. Among the herbaceous plants I found great abundance of *Angelonia Gardneri*, Hook., and a *Cleome* with large white flowers. In the middle of this tract there are some small fresh-water lakes that afforded me some good plants. To my great delight my first visit to this spot was rewarded with that curious aquatic fern *Parkeria pteridoides*, Hook., which at first sight has much the appearance of an Umbelliferous plant. The lower part of the fronds is much inflated, by which the whole plant, being rendered speci-

fically lighter than the water, floats upon the surface of the shallows, its long fibrous roots only reaching to the mud at the bottom. Along the borders of these lakes grew several large *Polygonums*, one of which has stout spikes of greenish-white flowers, and another considerably resembles our *P. amphibium*: there also abound *Pontederia paniculata*, *Hydrolea spinosa*, and a late species of *Ammannia*. Several parts are covered with a floating turf, consisting principally of different *Sedges*; and when this does not exist, *Jussiaea natans*, Humb., throws along the surface of the water its long floating branches, which are upborne by numerous small white cylindrical bladders attached to the lower side; the flowers are white, and about the size of those of *Ranunculus aquaticus*, to which, at a distance, the plant bears considerable resemblance. Mingled with the *Jussiaea* there exist vast quantities of a large species of *Azolla*, and the curious *Pistia Stratiotes*. In the wood itself grew many species of *Myrtle-blooms*, *Anonads*, *Cinchonads*, a few *Melastomads*, and great abundance of the Cashew-nut tree; also several species of *Coccoloba*, a *Vismeia*, *Zizyphus Gardneri*, Reiss., together with two or three species of *Byrsonima*. There were also many bushes of a species of *Eschweilera*, which when covered, as was then the case, with its curious pale yellow flowers, were beautiful objects. Twining among these and the other trees, I observed some fine plants of a *Gomphia*, its large panicles of golden blossoms harmonizing most agreeably with the shining dark-green foliage; likewise a species of *Trigonia*, and, on the banks of the river, an *Inga*, and a *Combretum* with large clusters of small pale-yellow highly-scented flowers. On first entering this wood I was particularly struck by the different aspect it presented to those of the same kind about Rio. Here every thing betokened a drier atmosphere and a more arid soil. No *Ferns*, *Begonias*, *Peppers*, or *Orchids*, were to be seen. On the stems and branches of the larger trees a few *Bromeliads* and *Arads* alone existed.

About 18 miles to the west of Pernambuco there exists a small German colony at a place called Catuca, which, being surrounded by virgin forest, I was desirous to visit. The first part of the journey was through a flat sandy country, partly planted with Mandioc, and partly in a wild state. The last hour's ride was through a forest, the under-wood of which consisted chiefly of *Melastomads*, *Myrtle-blooms*, and *Cinchonads*. The finest plant collected here was an *Acanthaceous* climber with large scarlet flowers.

On leaving this wooded tract, the cleared valley in which the colony is situated was gained. A young friend who accompanied me being desirous of having a day's hunting with

one of the Germans in the woods, I determined to accompany them, in the hope of making some additions to my botanical stores. In these woods, as in those near the town, there was a great lack of herbaceous vegetation, and in a walk of about two hours I only collected a few *Ferns*. In a hollow dense part of the forest I observed a very large tree, a species of *Lecythis*, the ground beneath which was covered with its large pot-like capsules and their lids, the nuts of the greater part having been taken out by the monkeys, who are very fond of them. After passing through this forest we came upon another cleared valley containing the ruins of several cottages. This had been the first site of the settlement, and had been abandoned a few years before. Near these dismantled dwellings we found plenty of pine-apples, and refreshed ourselves with some which were ripe. Moist open situations in this neighbourhood afforded me fine specimens of a species of *Coutoubea*, while in dry, sandy, and bushy places I met with a few plants of a large *Cyrtopodium*, and on the stump of an old tree a *Stanhopea*. In the wood I observed a fine tree covered with long spikes of bright yellow flowers, which, after having procured specimens, I found to be a species of *Vochysia*, a monandrous genus peculiar to South America. By the side of a small stream near the same place, the beautiful *Moronoea coccinea*, a small tree, bearing globose crimson blossoms, grew in the greatest abundance. On the following day I made an excursion into a different part of the forest, and added a few more specimens to my collections. I also picked up a few Orchideous plants, but these were very rare. On our return to Pernambuco I saw *Amaryllis Belladonna* abundantly in flower by the road-side, and we passed through large tracts covered almost entirely by the *Eschweilera* already mentioned. Near Pernambuco I likewise saw for the first time, and obtained fine specimens of, *Cochlospermum serratifolium*, D. C., a beautiful shrub reaching from 10 to 15 feet in height, with straight upright branches, which at the first period of flowering are almost destitute of leaves, the few that do appear being confined to the flowerless boughs. The flowers, which are large and of a shining golden colour, are produced in large panicles.

Other excursions in the vicinity of Pernambuco afforded me numerous novelties. Among these I may mention a *Melocactus* (*M. depressus*, Hook.) from dry, sandy, bushy tracts near the sea to the south of the town. The same spot also rewarded me with the beautiful *Epidendrum cinnabarinum*, Saltz., *Monachanthus fimbriatus*, Gardn., a *Norantea* bearing long spikes of crimson bracts and flowers, a *Gomphia* (*G. Fieldingiana*, Gardn. MSS.) with large bright green leaves, and long

spikes of yellow blossoms. In dry woods I met with *Sapindus esculentus*, St. Hil., the fruit of which is eatable, being agreeably acid; and *Gustavia augusta*, Linn., the noble blossoms of which, when expanded, are as large as those of the common white water-lily (*Nymphaea alba*), and are of a pale pink colour. Here, as elsewhere in Brazil, *Pteris caudata* is a troublesome weed in cultivated grounds.

On Hamarica, an island near the coast, about 30 miles to the north of Pernambuco, I spent a week. The whole of the island nearly is bounded by a deep belt of cocoa-nut trees, and the interior of it, which is flat, is but thinly wooded. There is not much large timber, the trees being in general small, and intermingled with large shrubs, which in many places, where they were thinly scattered, gave me more the idea of being in an English orchard than the uncultivated parts of a barbarous equatorial island. The trees I found to consist chiefly of *Genipapo* (*Genipa sp. n.*), a beautiful large tree, with dark green foliage and pale yellow flowers, which produces a hard fleshy fruit about the size of an apple, which, when rotten, the inhabitants eat along with sugar; the Cashew (*Anacardium occidentale*), of which the curious fruit was ripe, the juice of the large receptacle on which the nut is placed affording me a refreshing beverage during my walks into the country; also the *Mangaba* (*Hancornia speciosa*) was fully as abundant as at Olinda. The *Curatella americana* is also common, particularly in dry, open, rather elevated places. Some of the shrubs met with were particularly beautiful, especially a *Byrsonima* about 12 feet high, with broad woolly leaves, and spikes of yellow flowers; and a *Gomphia* nearly of the same size, and bearing large panicles of equally golden-coloured blossoms. Some of the dry hilly places were covered with a new species of *Ixina*, and on the sandy shores I met with *Polygala cyparissias*, St. Hil., and immense quantities of *Sophora tomentosa*, reaching to the height of from 8 to 12 feet, and beautifully in flower, while on rocky parts of the coast *Jacquinia armillaris* was equally common.

The following plants still remain to be introduced as ornaments to our hothouses:—

1. *Cochlospermum serratifolium*, D. C. Grows in a dry sandy soil.
2. *Eschweilera sp. n.* This is the smallest species of the natural order to which it belongs (*Lecythis*) that I have seen producing flowers. It would not only be very ornamental, but also a great botanical curiosity from the remarkable structure of its flowers. It grows in sandy places.
3. *Hancornia speciosa*, Gomez. The fruit of this plant, I

have no doubt, could be produced in England, as the tree is small.

4. *Gomphia Fieldingiana*, Gardn. MSS., in Herb. n., 958. A most beautiful shrub, also growing in very sandy places; besides this there are at least two other fine species of the same genus.

5. *Norantea*, sp. A very remarkable and truly beautiful climbing shrub. The spikes of crimson bracts and flowers are often upwards of 2 feet long. It grows in rather moist sandy places.

No. 4.—*The Vegetation of Alagoas and the Rio de São Francisco.* By George Gardner, Esq., F.L.S., Director of the Royal Botanic Gardens, Ceylon.

Till the proper season should arrive for the undertaking of a long journey I purposed to make into the interior, I determined to spend a few weeks in the small province of Alagoas, situated between that of Pernambuco and the Rio de São Francisco. A voyage of about 150 miles southward along the coast, in an open canoe, brought me to the town of Maceio. The country between the two places is rather flat, and generally wooded with small trees and shrubs, but the effects of the dry season on them had been so great, that although we slept on shore every night, I added but little to my collections. The country around Maceio is undulating but not high, and the ridges of low hills reach close to the sea. In a walk which I took shortly after my arrival, two or three miles to the N.E. of the town, over a flat sandy tract which lies between the sea and the rising ground, and not unlike the country around Pernambuco, I found many plants that were new to me. There were no large trees on it; the largest being the Cashew (*Anacardium occidentale*), *Sapindus saponaria*, and a few others, which not being in flower, I could not determine. The shrubs consisted of *Bauhinias*, *Myrtle-blooms*, *Marcetia taxifolia*, D. C., a *Humirium*, a new species of *Eschweilera*, equally handsome with that found at Pernambuco, but with larger leaves, flowers, and fruit, several *Coccolobas*, &c. The herbaceous vegetation was rather scant, consisting of a few *grasses*, a fine *Eriocaulon*, an *Epidendrum*, a *Dichorizandra*, a *Sphaerotheca*, *Herpestes Salzmanni*, Benth., *Stemodia verticillata*, Link., and *Acanthospermum hispidum*, D. C. The low hills were covered with low shrubs, consisting of some fine species of *Myrcia*, *Gomphias*, *Miconia holosericea*, D.C., *Schmidelia laevis*, St. Hil., *Erea Braziliensis*, Cham., and several species of the genera *Solanum*, *Erythroxylum*, *Croton*, *Diospyros*, &c. Here also grew *Stachytarpheta hirsutissima*,

Link., and on the branches of the small trees two or three species of *Viscum* and *Loranthus*.

The city of Alagoas, the capital of the province, is situated on the banks of a large lake which runs inland from the sea, and about 40 miles distant from Maceio. There I spent two days, having gone up by the lake in a small canoe. Along the shores of the lake, and on some little islands that are in it, the *Rhizophora Mangle* reaches to a much greater height than I have elsewhere seen it in Brazil, the stem being often more than a foot in diameter, and reaching to the height of 40 feet. In parts of the lake where the water was brackish, a *Potamogeton*, noways different from the British *P. pectinatus*, Linn., grew profusely; and at a place where we landed to procure some fresh water, I picked up a fine *Wedelia*, and a shrubby *Eugenia*. The country around the city of Alagoas has much the same appearance as that around Maceio, consisting of low wooded hills, with intervening valleys. Immediately below the city there is a large marshy place, through which a small stream issues. In this I found some curious aquatic plants, such as a *Potamogeton*, a large *Mayaca* with white flowers, *Cabomba aquatica*, *Marsilea quadrifolia*? and in some small fresh-water ponds a pale blue flowered *Pontedera*, and a white flowered *Nymphaea*, different from that found at Olinda. In moist sandy spots near ponds, *Angelonia Gardneri*, Hook., grew in the greatest profusion. Sugar, cotton, and mandioca, are the chief productions of the country in this district.

As the Rio de São Francisco was only about 90 miles to the south of Maceio, I resolved to visit it, and reach, if possible, the great falls of Paulo Affonso, which are about 200 miles from the sea. Embarking in a jangada, one of the raft-boats that are so common on the coast of North Brazil, I reached in two days a little village called Pelia, situated about five leagues to the north of the mouth of the São Francisco, the heavy surf which breaks on the bar not allowing small craft to approach nearer, and from thence made my way in a bullock-cart to another small village, situated on the north bank of the river, and about two leagues from its outlet. The country through which we passed was flat, in some places open and grassy, in others covered with shrubs, consisting of great quantities of *Mouriria guianensis*, Aubl., several species of *Laurus*, *Melastomads*, *Myrtle-blooms*, *Cinchonads*, &c. The few herbaceous plants found in flower in the open sandy places consisted of a fine *Hyptis*, with long procumbent stems, and large axillary solitary heads of violaceous flowers borne on long pedicels, *Physostemon rotundifolium*, Mart., a curious slender *Amaranthaceous* plant, a new Lupin-like *Zornia*, with large yellow flowers and quadrifoliate leaves, and a species

of *Calandrinia*? with rose-coloured flowers, the large green leaves of which are made use of by the Brazilians in the same manner as spinach. The river was greatly flooded, and overflowing its banks, and many families had been obliged to quit their dwellings, which were either carried away or quite submerged.

From this place I made a voyage up the river for about 140 miles, to a large island called the Ilha de São Pedro, which is chiefly inhabited by civilized Indians. I remained several days at a large town called Villa do Penedo, about 30 miles from the sea, but the vegetation was so much scorched up there that with the exception of a few *Myrtle-blooms*, *Loranthas*, and *Cinchonads*, nothing was to be met with in flower. The country on both sides of the river, as far up as I went, was of an undulating character, and had a most desert-like appearance, from being covered with low deciduous forests, which at that season were almost entirely destitute of leaves, rendered more so by the herbaceous vegetation being entirely withered up on the red-coloured soil. The greater part of the interior of Brazil is either open grassy campo, or covered with these forests, which in the language of the country are called *Catinga*. The great heat towards the end of the dry season produces exactly the same effect on them as the cold of winter on the deciduous forests of England, and other cold countries. Along the banks of the river to the distance to which it had overflowed its banks, a stripe of green existed, and there also the trees were larger than on the higher and drier parts of the country. Many of these trees and shrubs were in flower, and but for them my collections in this voyage would have been very poor. The large trees consisted of several kinds of wild Fig (*Ficus*), arboreous *Bignoniias*, *Leguminous* plants, &c.; and the shrubs of *Casalpinias*, *Melochias*, *Crotons*, *Lantanias*, a *Machaonia*, *Schmidelia*, *Laetia*, a *Tocoyena*, *Sapotads*, *Cordias*, &c. Where the banks were dry and rocky, they were covered with many fine species of *Cacti*. Among these were several kinds of *Opuntia*, some of them covered with the Cochineal insect, various species of *Cereus*, one of them with a stem three feet in circumference, branched only towards the top, and upwards of 30 feet high, and a handsome *Melocactus* (*M. Hookerianus*, Gardn.) with long spines, and about a foot in diameter. A single specimen of this exists at Kew, and another at Glasgow. When nearly opposite the Ilha de São Pedro we were all nearly drowned, being overtaken in the middle of the stream by a tremendous thunder-storm. From exposure at this time I was seized with a severe illness, from which I did not expect to recover. This caused me to remain about a fortnight on the island, and, giving up all idea of proceeding further up the river,

as soon as I had recovered sufficient strength I descended to Penedo, where I received the greatest attention from one of the principal families there, to whom I had brought letters of recommendation from Maceio. I then returned to Pernambuco.

XLIV.—Notice of a New Grape called Josling's St. Alban's.

By Mr. Robert Thompson, Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden.

It is but seldom that a Seedling Grape is obtained which can be recommended in preference to those varieties that have been long in cultivation; and still more rarely do seedlings possess any of that peculiarly rich flavour which characterizes the Muscats of Alexandria and the Frontignans. A grape having the high qualities of those just mentioned, and not liable to shank and shrivel, as every gardener is aware the Frontignans are too apt to do, must be a great acquisition; and such the seedling which forms the subject of this notice will undoubtedly prove.

It was raised by Mr. Robert Josling, Seedsman, &c., St. Albans, from seed sown about six years ago; and a notice of its fruit appeared in the 'Gardener's Chronicle,' 1845, page 660, as being excellent, rich and sugary, with a Frontignan flavour; and that the variety was deserving of extensive cultivation. This year fruit of it was exhibited at the Meeting of the Society in Regent-street, September 1st, for which a Certificate of Merit was awarded. The bunch, supported by a strong footstalk, is very long and tapering, with strong diverging shoulders. The berries are about the size of those of the White Frontignan, round, greenish-white, acquiring a tinge of golden-yellow when well ripened. Flesh rather firmer than that of the Frontignan Grapes, but not so firm as that of the Muscat of Alexandria, very rich and sugary, with a Frontignan flavour. The leaves, in their general outline, are tolerably round, their lobes not deep, but the serratures are tolerably sharp; both the upper and under surfaces are remarkably glabrous. The footstalks are long, glabrous, and slightly tinged with red. On the whole the leaves bear considerable resemblance to those of the White Muscat of Alexandria; the berries, however, differ in being decidedly round, like those of the Frontignans; but the leaves of the latter are not glabrous, being furnished with bristly hairs at and near the axils of the veins beneath. It is perfectly distinct from any other variety known.

The following has been received from Mr. Josling in reply to inquiries respecting this excellent grape:—“ About six years

ago I sowed some seeds of grapes disfigured by wasps, of the White Muscat, White Hamburgh, or Large White Nice, White Muscadine, and White Sweet-water; the Frontignan I did not grow at the time. These were gathered and sown promiscuously, so that I cannot say positively from which of these sorts the variety in question has originated. My opinion is, that it is between the White Nice and the Muscat; these grew side by side. In the following autumn, after the seedlings came up, two were planted by the side of each vine already growing; and the shoots trained up the rafters inside. Most of these have fruited, but proving worthless have since been cut away. I reserved three, besides the one which is the subject of this communication, but they are much inferior to it: for this I made space by cutting away the original vine, a Black Hamburgh, by the side of which it was planted. It differs most distinctly from the White Frontignan, from the time of showing fruit, until, and when, ripe. In showing its fruit the branches are very long, on amazingly stout footstalks, which strut diagonally from the vine in a manner very different from any I grow. At this stage they are very conspicuous throughout the house. After this the berries assume a dark-green colour, the Frontignan is of a pale-green; it shoulders, the Frontignan does not; the bunch tapers to a point, the Frontignan is more cylindrical; the footstalk throughout the bunch is very stiff, the Frontignan hangs loosely. In flavour it approaches the Frontignan more than any other grape; but even in this respect it differs materially, the berry in the mouth having more substance, and being more sugary and *sweetmeat* like; when ripe it assumes a dark-gold colour. The berries have their pedicels well extended, so that much thinning is not required. With regard to the foliage, on first breaking it has not that white mealy appearance which the Frontignans have; it more resembles the Black Hamburgh in all its habits of growth. In ripening this variety is rather later than the Frontignan, and has not shranked with me, nor shrivelled in the berry, as does the Frontignan.

"I have grown thirty rafters of grapes in three houses, of the leading kinds, within the last sixteen years, and I can assert that it is decidedly distinct from any that I grow. Its habit of growth is strong and robust; and altogether I consider it a valuable variety." In this opinion I concur.

NEW PLANTS, ETC., FROM THE SOCIETY'S
GARDEN.

45. *ADAMIA VERSICOLOR.**

China, Mr. Fortune, who found it on the island of Hong Kong, growing in the ravines about half way up the mountains. Received at the Garden July, 1844.

A fine bush, with much the appearance of *Hydrangea japonica*, so far as the foliage is concerned. The flowers, however, are quite different. They form a pyramidal panicle nearly a foot in diameter, and, when expanded, are of the most brilliant violet blue; when in bud they are at first white, but gradually change to purple and violet, until their full expansion, when they measure nearly an inch in diameter. The petals are seven or occasionally six in number, and form a seven or six-pointed star.

In many respects the species agrees with *Adamia cyanea*, but its leaves and flowers are much larger, and it has twenty stamens, not ten. A figure of it will be given in a future number of the Journal, when the plant will be more fully described.

It is easily grown in any good soil, and requires such treatment as is generally given to *Hydrangeas* and similar plants, but it will be less hardy than they are, and will consequently require the protection of the greenhouse. It is readily increased by cuttings treated in the usual manner.

The habit of this plant is good, and the fine large panicle of blue flowers which it bears gives it a very ornamental appearance. Moreover, if it should fruit in this country, its fine blue berries will be as pretty as the flowers.

Sept. 2, 1846.

46. *JACQUEMONTIA CANESCENS.* *Bentham Plant.* *Hartweg,*
p. 226, No. 1234.

Raised from seeds, collected by Mr. Hartweg near the village of Fusagasuga, in the province of Bogota.

A perennial twining plant, with the stems and leaves closely covered with a short down, which is brown and white, and by no

* *Adamia versicolor* (Fortune); foliis oblongo-lanceolatis acutè dentatis basi integris in petiolum angustatis subtus in costas pubescentibus, panícula pyramidali pubescente, ramulis cymosis, floribus heptameris icosandris.

means justifies the name of *canescens* given the species by M. Kunth. The leaves are about 2 inches long, of a firm texture, concave, heart-shaped at the base, with an oblong outline which is rather wavy. The flowers grow in close cymes of from nine to eleven each, on stalks somewhat shorter than the leaves. They are of a clear bright blue, and very handsome. The corolla is an inch and a half across, with a flat limb, a very short tube, and long projecting stamens.

The species has been regarded by M. Choisy as a variety of *Jacquemontia violacea*, the *Convolvulus pentanthus* of gardens, but it is certainly quite distinct and far handsomer.

It grows freely in soil composed of equal parts of peat and loam, mixed with a little sand. In this country it must be treated as a greenhouse climber, and its slender stems trained round a trellis fixed in a pot, or it may be planted out in the border of the house and trained up the rafters. In either place it will succeed very well, and flower abundantly during summer and autumn. It strikes readily from cuttings prepared in the usual way.

It is a welcome addition to our collections of greenhouse creepers, as its habit is neat, and the flowers are of the same colour and larger than in the *J. violacea* just noticed.

Aug. 26, 1846.

47. *STIGMAPHYLLON MUCRONATUM*. *Adrien de Jussieu, Monogr. des Malpighiacées*, p. 123. (*Banisteria mucronata*, *De Candolle*.)

Mexico ; sent to the Society by Mr. Hugo Finck.

This is a twining plant with fleshy roots and opposite ovate oblong leaves terminated by a small point. They are of a bright light-green colour, and have a pair of glands on the stalk just where the leaf sets on. The flowers are of a rich canary-yellow, rather larger than a shilling, with spoon-shaped brown petals, delicately fringed and wrinkled ; they grow in small clusters.

In this country it must be treated as a greenhouse plant. It will succeed best if planted out in the border of the house and trained up the rafters. When kept in a pot it is necessary to have a trellis made, round which the branches can be trained. Any good garden soil seems to suit it, and it strikes readily enough from cuttings. As it has a thick fleshy root, it requires but a small supply of water after it has made its growth for the season.

If the species flowers freely it will be a desirable plant owing to its neat habit, which is that of the *Stigmaphyllons* in cultivation.

Sept. 5, 1846.

48. *Berberis Fortuni.* *Lindl.* (see p. 232.)

I have already stated, in my notice of this plant at page 232, that it was first discovered in a nursery-garden in the north of China, and that there is every probability of its proving hardy

enough to succeed well in the open air in England. It is a favourite plant with the Chinese, who call it the “*Che-wang-chok*,” or the “Blue and Yellow Bamboo,” so named from the peculiar tint of bluish-green which the leaves have, and from the yellow colour of the flowers. The Chinese, who are not very particular about generic distinctions, call a great number of plants Bamboos, which, according to our ideas of genera, have nothing at all to do with them. In this instance the plant is named from a slight resemblance which its stems have to those of the Bamboo.

It is a fine shrub, particularly valuable owing to the beauty of its dark-green pinnated foliage, and its neat compact habit. If it prove hardy it will make a very ornamental plant for a lawn or rockwork, where neat evergreens are always most desirable. In its native country it flowers in the autumn, producing numerous little yellow spikes, which are well represented in the accompanying wood-cut. In the garden of the Society, where it has been for some months, it is found to strike easily from cuttings, and to grow well in any common soil.

R. FORTUNE.

49. LYSIMACHIA CANDIDA.*

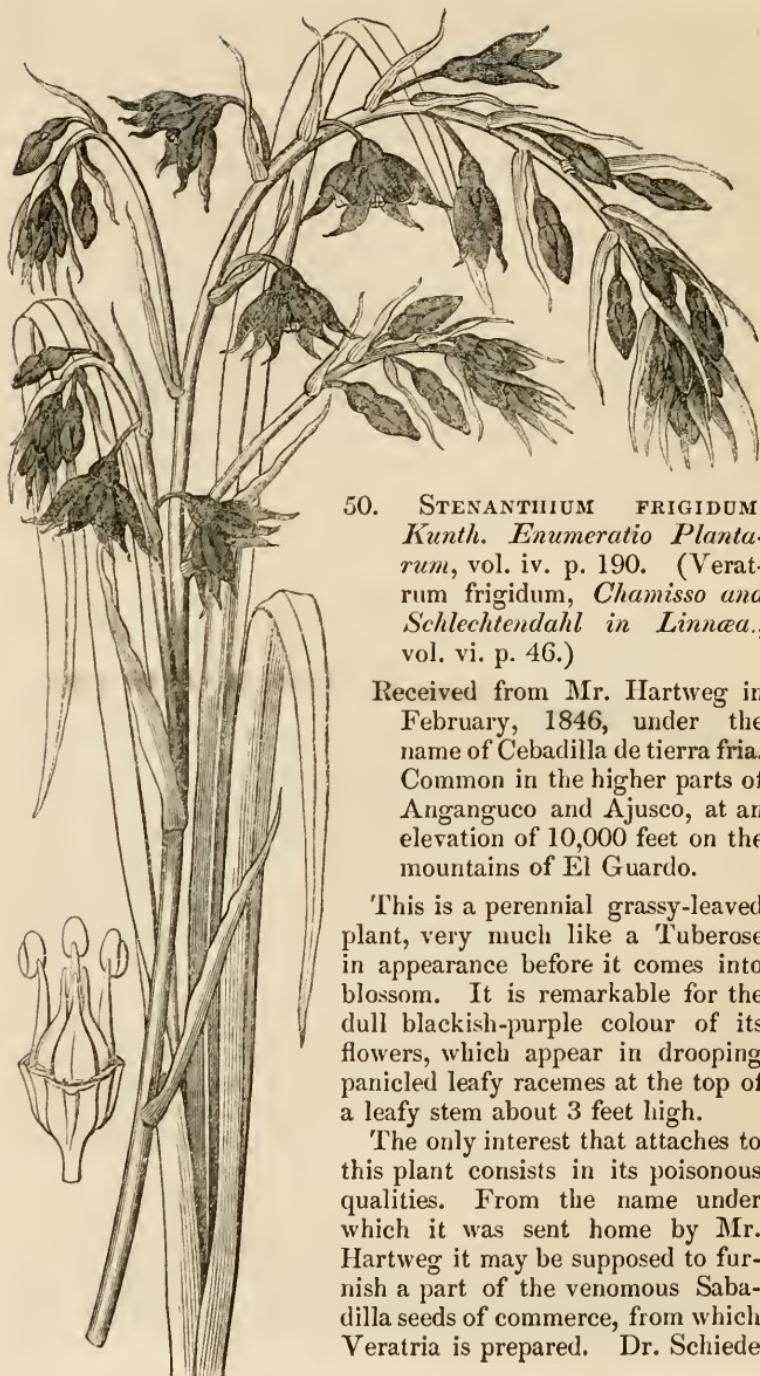
Raised from the soil contained in one of the boxes sent from China by Mr. Fortune, April 6, 1846.

This is a dwarf, compact, dark-green herbaceous plant, growing about a foot high. It is perfectly smooth. The radical leaves are narrowly oval, tapering into the stalk, and about 4 inches long; those of the branches are very narrow, and somewhat spatulate; all of them are very obscurely toothed at the edge, or show some tendency to be so, and are marked by scattered dark-purple dots, which are not seen unless the leaves are viewed by transmitted light. The flowers grow in close racemes, are white, and have much the appearance of those of *L. Ephemerum*, but the corollas are much larger.

From the short time it has been in the garden it is impossible to state what its proper mode of treatment may be. It will in all probability prove hardy, or at least enough so for bedding out in the flower-garden. It appears to be a plant of free growth, and likely to succeed in any sort of soil. From the profuse manner in which it blossoms, it will doubtless be abundantly multiplied from seed.

June 29, 1846.

* *L. (Ephemerum) candida*; glaberrima, foliis obsoletè dentatis integrisque sparsè punctatis radicalibus ovalibus in petiolum angustatis rameis linearì-spathulatis, caule ramoso, floribus racemosis, bracteis subulatis pedicellis brevioribus, calyeis laciniis subulatis tubo corollæ imberbis æqualibus.—J. L.



50. *STENANTHIUM FRIGIDUM.*
Kunth. *Enumeratio Plantarum*, vol. iv. p. 190. (*Veratrum frigidum*, Chamisso and Schlechtendahl in *Linnaea*., vol. vi. p. 46.)

Received from Mr. Hartweg in February, 1846, under the name of Cebadilla de tierra fria. Common in the higher parts of Anganguero and Ajusco, at an elevation of 10,000 feet on the mountains of El Guardo.

This is a perennial grassy-leaved plant, very much like a Tuberose in appearance before it comes into blossom. It is remarkable for the dull blackish-purple colour of its flowers, which appear in drooping panicled leafy racemes at the top of a leafy stem about 3 feet high.

The only interest that attaches to this plant consists in its poisonous qualities. From the name under which it was sent home by Mr. Hartweg it may be supposed to furnish a part of the venomous Sabadilla seeds of commerce, from which Veratria is prepared. Dr. Schiede

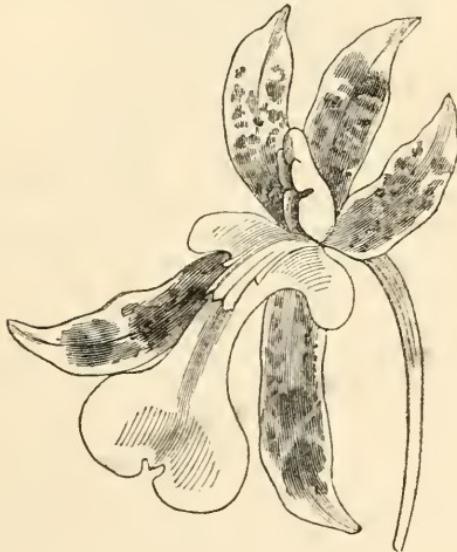
says (*Linnæa*, vol. iv., p. 226,) that the inhabitants of Mount Orizaba, where it grows wild, know it to be dangerous to the horses that bite it, and in another place that it is called the "Sevoeja."

It is probably a hardy perennial, requiring to be grown in peat soil and a rather moist situation during summer. It is increased freely by dividing the old roots when in a state of rest. It flowers in June and July, and obtains a height of 2 or 3 feet.

June 30, 1846.

51. ONCIDIUM UNGUICULATUM.*

Presented to the Society by C. B. Warner, Esq., F.H.S., who purchased it at a sale of Mexican Orchids.



This is one of the finest yellow Oncidiums in cultivation. Its oval shining pseudo-bulbs are 3 inches long. The leaves are a foot long and $1\frac{1}{2}$ inch wide. The scape is 3 feet high, and divided into several slender straight rod-like branches, over which, at the distance of about 2 or 3 inches, are scattered the

* *O. unguiculatum*; pseudobulbis ovalibus nitidis ancipitibus 2-3-phyllois, foliis lanceolatis erectis apice recurvis, scapo stricto paniculato multo altiori ramis paucis rectis distantibus, floribus secundis, sepalis petalisque lanceolatis subundulatis æqualibus liberis maculatis, labelli trilobi lutei unicoloris laciniis lateralibus nanis rotundatis intermediâ unguiculatâ transversâ bilobâ, cristâ linearî apice 3 medio 2-dentata, columnæ alis truncatis rotundatis.—J. L.

fine large flowers in a one-sided manner. They are nearly $2\frac{1}{2}$ inches long and about $1\frac{1}{2}$ inch wide, so that they present to the eye a somewhat narrowed appearance. This is owing to the form of the lip, which is pure bright yellow, with a long stalk to the transverse 2-lobed middle segment. The sepals and petals are greenish-yellow, spotted with brown.

We have no *Oncidium* in cultivation to which this bears much resemblance. It is, however, apparently allied to the *O. macropterum* of Richard and Galeotti, if any judgment can be formed from the slight specific character of it, published in the 'Annales des Sciences.' In that plant, however, the column-wings are said to be extremely broad (*latissimæ*), and no allusion is made to the very remarkable length of the stalk of the middle lobe of the lip.

Sept. 11, 1846.

52. FUCHSIA TETRADACTYLA.*

Guatemala; G. U. Skinner, Esq., April 4, 1846.

A slender downy plant about 2 feet high, with very soft branches of a dull crimson colour. The leaves are opposite, about 27 inches long, half of which belongs to their stalks, obovate-oblong, obtuse, a little blistered in consequence of their lateral veins being much sunken. The flowers, which are small, and deep rose colour, grow singly in the axils of the leaves. The calyx is half an inch long; the petals much shorter and paler than the lobes of the calyx, flat, blunt; and the stamens much shorter than the petals; the style longer than all, with a large star-shaped stigma divided into four fleshy finger-like rays. It is nearly allied to *F. thymifolia* and *cylindrica*.

It appears to be a greenhouse plant. As yet it has been grown in sandy peat, but there is reason to believe that it will succeed under the same treatment as those numerous hybrids which are to be seen during the summer in every greenhouse. Like *F. fulgens*, it has a large fleshy root, so that in autumn it may be stowed away in any corner, where it may be kept comparatively dry and free from frost till spring.

Its flowers are, however, too small to render it interesting to any except botanists.

July 4, 1846.

* *F. (Encliandra) tetradactyla*; tuberosa, gracilis, subherbacea, leviter pubescens, foliis oppositis obovato-oblongis longè petiolatis ob venas laterales immersas subbullatis, pedunculis axillaribus solitariis unifloris petiolorum longitudine, ovario sphærico, floribus hermaphroditis, calycis lacinias triangularibus patulis, petalis oblongis obtusis planis breviribus, staminibus brevissimis, stylo piloso, stigmate maximo tetradactylo.—J. L.

53. PLATYCODON GRANDIFLORUS, *with semi-double white flowers.*

Sent in April, 1845, from China, by Mr. Fortune, who found it cultivated in nursery-gardens near Shanghae.



This is a striking variety of the beautiful *Platycodon grandiflorus*, remarkable for having pure white blossoms, consisting of one 5-lobed corolla placed within another so exactly that the two constitute a large white star of ten points. There is no tendency to further irregularity of structure, unless it be that the

two corollas of this variety are flatter than the single one of the wild blue form.

Although it is doubtful whether or not this beautiful thing will prove hardy, few will deny it room in their greenhouse. It appears to grow freely in any sort of soil, and to require an ample supply of water in summer. Like the generality of plants with fleshy roots it must be put to rest in autumn, so that in winter it may be kept quite dry. In spring it may be re-potted and started to grow in the usual way. It strikes very freely from cuttings.

July 4, 1846.

54. *ABUTILON RUFINERVE.* *A. de St. Hilaire Flora Brasiliæ meridionalis*, vol. i., t. 42.

Sent home by Dr. Lippold from the Rio Doce, and presented to the Society by Sir P. de Malpas Grey Egerton, Bart., M.P.

This is a half-shrubby downy plant, with stalked cordate acuminate leaves, which are bordered with small crenatures, and are sometimes extended on one side into a lobe. The flowers are as large as those of *A. striatum*, erect, straw-coloured, and in twos or threes at the end of the branches. They are succeeded by ribbed, wrinkled, coarsely hairy seed-vessels.

It is easily propagated by cuttings or seeds, and grows well in any common garden soil. Such treatment as is generally given to the Hibiscus tribe suits it perfectly.

As an ornamental plant it is not of much value, for it will not prove hardy, and the flowers are not showy enough for the greenhouse.

Sept. 5, 1846.

55. *ATROPA ACUMINATA.* *Royle's Illustrations of the Botany, &c., of the Himalayahs*, p. 279.

Received from Capt. Wm. Munro in April, 1845, and said to have been collected in Chinese Tartary, at an elevation of 12,000 feet.

This plant is very much like our European *A. Belladonna*; but its leaves are firmer, narrower, and very much tapered to the point; and the flowers are a pale dull yellow, without a trace of the chocolate colour so characteristic of the European Belladonna. The berries are not distinguishable.

It is a hardy perennial, growing freely in any common garden soil, and easily increased either by seeds, or by dividing the old roots when in a dormant state. It grows about 4 feet in height, and flowers in June and July.

It is only valuable as a distinct kind of Deadly Nightshade, with yellow flowers.

June 23, 1846.

56. CLEMATIS GRAVEOLENS.*

Raised from seeds presented to the Society by the Honourable Court of Directors of the E. I. Company, and collected by Capt. Wm. Munro in "Chinese Tartary and the Snowy Passes, at an elevation of 12,000 feet, in October, 1844."



A small slender climbing species, perfectly destitute of hairiness, except on the calyx and fruit. Leaves with very small ovate, 3-lobed leaflets, and long straggling footstalks. The flowers are solitary, at or near the extremity of the branches, pale yellow, rather pretty, but emitting a heavy smell, which is more disagreeable than pleasant.

It is a hardy climber, very neat, and well worth cultivating. It grows freely in any good loamy soil, and is easily increased by

* *C. graveolens*; (*Flammula*) *glaberrima*, *gracilis*, *caule scandente filiformi angulato*, *foliis pinnatum bi-triernatis foliolis parvis 3-partitis trilobisque laciniis ovatis integris nunc hinc inciso-serratis*, *floribus solitariis*, *pedunculis foliis longioribus*, *sepalis 4 oblongis obtusis apice recurvis intus tomentosis*, *achæniis pubescentibus caudis plumosis*.—J. L.

cuttings. The seed was only sown on the 17th of May, 1845, and the plant was in flower by the end of July, 1846.

Sept. 11, 1846.

57. BATATAS JALAPA. *Choisy Conv. rar. p. 125. De Cand. Prodr., 9, 388.*

Sent to the Society from Mexico by Mr. Hugo Finck.

A perennial plant with a great tuberous root, which appears to be one of the kinds of jalap used in medicine. It was introduced in the time of Miller, but has been long lost to our gardens, and is well figured in the 'Botanical Register,' t. 621. The leaves are deep green, white with wool underneath, very much wrinkled on the upper side, and wavy, but never lobed. The calyx is perfectly smooth, and the corolla, of a rich rose colour, is between 2 and 3 inches long. The ovary is two-celled, with two ovules in each cell.

This is certainly a very distinct plant from the *Ipomoea macrorhiza* of Michaux, which has been confounded with it by all botanists, and whose root, which weighs it is said fifty or sixty pounds, is eatable; for that species has deeply-lobed leaves and a *hairy calyx*.

Its cultivation is very easy, for it grows freely in any good garden soil, and strikes readily from cuttings. It is a climbing plant like the *Convolvulus*, and requires a trellis on which it can be trained and its flowers shown to advantage. Water should be liberally supplied during the growing season, but the roots must be kept rather dry in winter, when the plant is in a resting state.

The large rose-coloured flowers of this species are very handsome, and as its habit is good it is well worthy of being again introduced to our gardens.

Aug. 26, 1846.

MEMORANDA.

Superphosphate of Lime.—When a small portion of superphosphate of lime is mixed with seeds when sown, in sufficient quantity to give them the appearance of being limed over, the seeds germinate quicker and stronger, more especially in the case of old seeds; and it is also found that the plants are less liable to damp off, or be injured by insects.—GEO. GORDON.

Several sorts of manure having been sent to the Garden by their respective inventors, viz. Dr. Hallett's concentrated liquid fertilizer, Harris's liquid manure, and Potter's liquid guano, it was thought desirable to use them in comparison with other kinds of manure, and the following trials were made. Twelve plants of *Fuchsia grandiflora* were taken from a cutting pan, and potted in 6-inch pots; the soil consisted of peat and loam in equal proportions. The first pot was in its natural state; in the second 1 oz. of charcoal was mixed in the soil; in the third 1 oz. of charcoal as a top dressing; in the fourth $\frac{1}{2}$ oz. of superphosphate of lime in $\frac{1}{2}$ pint of water; in the fifth $\frac{1}{2}$ oz. of superphosphate of lime mixed in the soil; in the sixth $\frac{1}{4}$ oz. of phosphate of ammonia in $\frac{1}{2}$ pint of water; in the seventh $\frac{1}{2}$ oz. of apatite on the surface of the soil; in the eighth $\frac{1}{2}$ oz. of apatite mixed in the soil; in the ninth one tea-spoonful of Dr. Hallett's concentrated liquid fertilizer in $\frac{1}{2}$ pint of water; in the tenth one tea-spoonful of Harris's liquid manure in $\frac{1}{2}$ pint of water; in the eleventh one tea-spoonful of Potter's concentrated liquid guano in $\frac{1}{2}$ pint of water; in the twelfth 1 oz. of cow-dung mixed in the soil. The plants were all placed side by side, and received nothing more for upwards of four months, except water when they required it. The plant which received Harris's liquid manure and those which had apatite grew much faster than any of the others. Those which had cow-dung and phosphate of ammonia were always darkest in colour. The plant which received Potter's concentrated liquid guano kept lingering on for three months and then died. The result was as follows :

Harris's liquid manure	:	:	:	:	}	Equal Best.
Apatite on the surface	:	:	:	:		
Ditto in the soil	:	:	:	:	}	
Charcoal in the soil	:	:	:	:		
Ditto as a top dressing	:	:	:	:	}	Second.
Superphosphate of lime in water	:	:	:	:		
Cow-dung	:	:	:	:	}	Third.
Phosphate of ammonia	:	:	:	:		
Superphosphate of lime in the soil	:	:	:	:	}	Fourth.
Dr. Hallett's concentrated liquid fertilizer	:	:	:	:		
Pure soil	:	:	:	:	}	Fifth.
						Sixth.

JAMES DONALD.

BROCOLI.

Walcheren Brocoli, or Cauliflower.—A few genuine seeds of this most valuable production were presented by Mr. Legge, gardener, Bishopsthorpe, by whom the variety was first produced. The heads are large, firm, white, like a very fine Cauliflower, which in fact it closely resembles in appearance, except that the leaves are not so plain as those of the Cauliflower. The difference in constitution must however be very considerable, for it not only stands the winter cold, but likewise the summer drought much better than Cauliflowers do; scarcely a head of the latter could be obtained in the dry hot summer of 1844, and at the same time a quarter of Walcheren Brocoli

formed beautiful heads of uniform closeness. The following are notes respecting it from Mr. Legge:—"For the supply of a family, sow the 3rd week in April, middle and end of May, the middle and end of June, and the middle and end of July. This attention will give a regular supply till the end of the year. I had a regular supply last year till January 21st. For the purpose of sowing seed, I recommend to sow my Walcheren Brocoli at the time that the winter Cauliflower is sown, say about the 25th or 27th of August, and winter the plants under hand-glasses as Cauliflowers. Give them good soil, not too light, nor leave more than 3 or 4 plants under each glass, and let them be well attended to with respect to air." Those who have the means ought to take the greatest possible care to save this variety from degeneration; for it is more deserving of attention than all the races of sulphur, purple, and cream-coloured Brocolis put together; some amongst these may be good as regards size and quality, but the colour is always objectionable, and no one would certainly think of using any except white, if he could help it. There is now no necessity in almost any case, for by timely sowings the Walcheren will afford a long and excellent supply equal in quality and appearance to Cauliflower.

Snow's Superb White Winter Brocoli.—This was obtained from Mr. Glendinning, nurseryman, Turnham-green. It is a dwarf variety, with broad leaves and short petioles. The head is large, very compact, and as white as a Cauliflower. If sown in the beginning of May, it comes into use in November, and three successional sowings at intervals of a fortnight will give a winter supply.—R. THOMPSON.

END OF VOL. I.

This has arisen from the following circumstances :—

1. In consequence of the continued wetness of the summer of 1845, the number of tickets sold on account of the exhibitions was less than in the previous year by 2900, and the receipts were diminished to the extent of 587*l.* 7*s.*

2. On the other hand the expenses of the exhibitions unavoidably increased: refreshment was provided for the exhibitors, and a new room was built expressly for their accommodation, the latter at the cost of 150*l.* 16*s.* 2*d.* Unusual expenses for tents, tables, an orchestra, &c., were incurred to the extent of nearly 286*l.* The cost of the medals awarded exceeded that of 1844 by the sum of 279*l.* 10*s.*

3. The effect of this decrease of receipts and increase of outlay has been to diminish the balance on the garden exhibitions in favour of the Society to the extent of about 1168*l.* Had the same balance been realized as in 1845, the debt would have been diminished to the extent of 720*l.*, instead of being increased by 448*l.*

But the debt would not have been diminished to any greater amount, because of the following charges in the year now ended :—

Some alterations and improvements in the plant-	£.	s.	d.
houses at the garden amounted to upwards of .	350	0	0
The cost of Mr. Fortune's expedition has been .	689	17	4
That of Mr. Hartweg's new mission	220	2	10
Cost of the Journal	171	7	11
Law expenses incurred in the attempt, which failed, to establish the Society's right to exemption from local rates, &c., under the provisions of the Act of 6 and 7 Vict., c. xxxvi.	78	19	0
	£1,510	7	1

The Council trust that the Fellows of the Society will agree with them in considering these expenses quite necessary. The small increase of debt which has taken place during the past year has obviously arisen from them, and from the operation of the temporary causes already explained; and the Council entertain a confident belief that the balance-sheet of 1847 will show as favourable a state of the Society's affairs as in former years.

The Council would have been glad to report that the amount of arrears due by Fellows, and remaining unpaid, had been more diminished than it is found to be. The Council are still engaged

in endeavouring, by the means at their disposal, to reduce the arrears still further; and they trust that their efforts will be eventually crowned by success.

The Council deem it necessary here to state, that the number of Fellows elected continues to be smaller than that of those who die, or for various reasons quit the Society; the number of Fellows at the present time being 1233, which is 19 fewer than at the anniversary in 1845.

It does not, however, appear that the prosperity of the Society is at present affected by this circumstance, so very large a portion of its income being derived from the Exhibitions at the Garden, which annually add a very considerable sum to the ordinary income of the Society derived from subscriptions and the admission fees of Fellows. The funds thus obtained have been so largely furnished that they have enabled the Council not only to reduce the debt to the extent above stated, and to maintain the efficiency of the Society, but also to expend very considerable sums in medals and rewards to meritorious gardeners.

The following return shows the number of visitors to the Garden Exhibitions in each year since 1840:—

1840.	May . . .	2,471	1843.	May . . .	4,654
	June . . .	11,594		June . . .	10,862
	July . . .	5,072		July . . .	7,373
		<hr/>			<hr/>
		19,137			22,889
		<hr/>			<hr/>
1841.	May . . .	5,600	1844.	May . . .	4,203
	June . . .	8,975		June . . .	13,334
	July . . .	7,194		* July 13, 4,052 } * , , 31, 2,267 } 6,319	<hr/>
		<hr/>			<hr/>
		21,769			23,856
		<hr/>			<hr/>
1842.	May . . .	5,369	1845.	May . . .	3,481
	June . . .	13,351		June . . .	12,310
	July . . .	3,445		July . . .	5,966
		<hr/>			<hr/>
		22,165			21,757
		<hr/>			<hr/>

* N.B. In consequence of the first meeting in July having been excessively wet, a second meeting was held on the 31st of the month, without an Exhibition.

PROCEEDINGS AT MEETINGS OF THE SOCIETY.

January 16, 1844. (REGENT STREET.)

ELECTIONS. J. Stewart, Esq., M.P., Albany.

AWARDS. *Knightian medals*: 1. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for two fine specimens of *Epacris nivalis* and *impressa*, concerning the cultivation of which the following account was given. Mr. Ayres stated that the treatment which they received during the past season differed much from what is usually considered proper for this tribe of plants. Instead of being grown in an airy greenhouse, they were subjected to a close moist heat of from 60° to 90°, with no more air than was necessary to keep the heat from exceeding what is above stated. After sunset, especially on dewy evenings, air was freely admitted; but the plants were syringed, and the house was closed before the sun came upon it the following morning. The rate of growth was said to be so rapid that to keep the plants from flagging they had to be shaded during bright sunlight. Many who saw them during summer said that they would not set any flower-buds; but the result proved that a fine show of flowers is not incompatible with luxuriant growth, provided the precaution is taken to get the young wood properly matured before winter. 2. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for various Orchids, especially *Lælia anceps*, and an *Epidendrum nutans*, 7 feet in height, and 3 feet across.

Banksian Medal to Mr. S. Gad, gardener to T. J. Lenox, Esq., for a specimen of *Clerodendron splendens*.

Certificates: 1. To G. Crawshay, Esq., of Colney Hatch, for well-ripened specimens of Black Hamburg Grapes, cut on the 15th of January. Mr. Crawshay grows his grapes in a viney where no fire-heat is employed, except in very dull damp weather; small fires are occasionally lighted, not to

increase the temperature, but merely to dry up the damp ; the vines are allowed to have great ventilation, and from this circumstance the grapes are well ripened, which is the great secret of their keeping. 2. To Mr. R. Ayres, gardener to C. L. Stephens, Esq., of Roehampton Grove, for Cucumbers, especially a fine specimen of the White Spine. 3. To J. Moorman, Esq., of Portland Place, Clapham Road, for a collection of Pears, among which were specimens of Napoleon and Passe Colmar, in good condition.

NOVELTIES FROM THE SOCIETY'S GARDEN. Specimens of the Winter Crassane Pear, an excellent variety raised by the late Mr. Knight, not only resembling a Crassane in appearance, but also in flavour. It is a most abundant bearer, and so perfectly hardy that it does not at all require the help of a wall to bring it to perfection.

BOOKS PRESENTED.

- The Ladies' Flower Garden of Ornamental Perennials, Nos. 23 and 24. From Mrs. London.
- Proceedings of the American Philosophical Society, No. 26, vol. 2, and No. 27, vol. 3. From the Society at Philadelphia.
- Proceedings of the Geological Society, Nos. 94, 95, and 96. From the Society.
- The London Polytechnic Magazine, No. 1. From the Editor.
- Paxton's Magazine of Botany, for September, October, November, and December. From the Editor.
- Transactions of the Society of Arts, vol. 54. From the Society.
- The Journal of the Royal Asiatic Society, No. 14. From the Society.
- The Florist's Journal, No. 52. From the Editor.
- Harrison's Floricultural Cabinet, for December and January. From the Editor.
- The Botanical Register for January. From the Publishers.
- Part 2, vol. 4, of the Journal of the Royal Agricultural Society. From the Society.

February 20, 1844. (REGENT STREET.)

ELECTION. H. Warre, Esq., of Croydon.

AWARDS. *Large Silver Medal* to Mr. J. Brewster, gardener to Mrs. Wray, of Cheltenham, for a plant of *Laelia superbiens*, having a spike about $5\frac{1}{2}$ inches long, of large purple blossoms. This plant, the honour of first flowering which belongs to Mrs. Wray, and which has created much interest, is a native of Guatemala, where it was first discovered by Mr. Skinner—the finest specimens being in ravines, and growing out of the fissures of rocks sheltered from north-west winds. Some of the wild plants have pseudo-bulbs 22 inches high, and flower-stems four yards long, bearing 22 flowers each. Mr. Hartweg, who also met with it in abundance in the neighbourhood of Chantla, where it is planted by the Indians in front of their doors and exists in immense quantities, states that the length of a stem, measuring four

yards, is uncommon, and that the average number of flowers in clusters is from seven to fifteen. According to Mr. Skinner, it thrives best in a temperature from 55° to 65°.

Knightian Medal to Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for Begonia manicata, Oncidium longifolium, and a beautiful plant of Epacris variabilis.

Banksian Medals: 1. To Mr. Kennington, gardener to F. G. Cox, Esq., of Stockwell, for a fine specimen of Phalaenopsis amabilis. 2. To Messrs. Henderson, of Pine-apple Place, for beautiful plants of Dendrobium nobile and Franciscea latifolia. 3. To Mr. J. Wells, gardener to W. Wells, Esq., F.H.S., for a fine plant of an Enkianthus, resembling E. quinqueflorus.

Certificates: 1. To Mr. W. Scott, gardener to C. Barclay, Esq., for a cut specimen of a flower from a bulb sent from Peru by Mr. Hartweg. 2. To Mr. J. Plant, gardener to J. H. Schroder, Esq., of Brixton, for a very large specimen of Epidendrum odoratissimum. 3. To J. Allnutt, Esq., of Clapham, for a plant of the Double White Primula sinensis. 4. To W. Jackson, Esq., of Salcombe, Kingsbridge, Devon, for specimens of the Seville Orange, Malta Sweet Orange, Shaddock, and Lemons, which had been grown on an east wall, protected only by a glass frame in winter; they were large, well-coloured fruit. 5. To J. Moorman, Esq., for a collection of Pears in a state of high preservation.

NOVELTIES FROM THE SOCIETY'S GARDEN. Spiranthes cerina, sent by Mr. Hartweg, and a species of Stenomesson from the same collector.

BOOKS PRESENTED.

Le Bon Jardinier for 1844. From M. Vilmorin.

The Athenæum for January. From the Editor.

The Botanical Register for February. From the Publishers.

The Florist's Journal, No. 53. From the Editor.

The Floricultural Cabinet, No. 132. From Mr. Jos. Harrison.

Paxton's Magazine of Botany for January and February. From the Editor.

The Ladies' Flower Garden of Ornamental Perennials, No. 26. From Mrs. Loudon.

On the Respiration of the Leaves of Plants. From the Author, W. H. Pepys, Esq.

Flora Batava, No. 131. From his Majesty the King of Holland.

Suggestions received by the Agricultural and Horticultural Society of India, for extending the cultivation and introduction of Useful and Ornamental Plants, compiled by H. H. Spry, M.D., 8vo, Calcutta, 1841.

Proceedings of the Agricultural and Horticultural Society of India.

The Monthly Journal of ditto. From Dr. Royle.

March 5, 1844. (REGENT STREET.)

ELECTIONS. Col. W. Mason, Necton Hall, Swaffham; J. Dixon, Esq., Enfield, Middlesex; G. H. Hooper, Esq., of Stanmore, Middlesex, New Shoreham, Sussex, and 19, Bloomsbury-Square; J. Dearden, Esq., Orchard, Rochdale; and A. G. Fullerton, Esq., Devonshire House, Piccadilly.

AWARDS. *Large Silver Medal* to S. Rucker, Esq., F.H.S., of Wandsworth, for various Orchids ; especially two exceedingly handsome large-flowered varieties of *Lycaste Skinneri*, and a fine specimen of *Phalaenopsis amabilis*.

Knightian Medals : 1. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for plants of *Schomburgkia undulata* and *S. crispia*, *Camarotis purpurea*, and a well-grown specimen of *Styphelia tubiflora*. 2. To Messrs. Rollisson, of Tooting, for beautiful plants of *Dendrobium densiflorum* and *D. Cambridgeanum*; *Cœlogyne cristata*, *Cattleya Mossiae*, a *Maxillaria* from Guatemala, and a new species of *Miltonia* from Brazil.

Banksian Medal to Mr. Glendinning, of the Chiswick Nursery, for a beautiful plant of *Eriostemon buxifolius*, concerning which the following account was given :—“ This is one of the prettiest plants we have, and may be forced into flower at any period during the winter months. Its fine dark green foliage, and neat habit, combined with its abundant snow-white sweet-scented blossoms, render it an object of much interest. It will bear much forcing without injury, and remains in blossom for a considerable period. It is, therefore, a plant desirable for decorating the conservatory or drawing-room in winter. Cut sprigs of it are very useful in making bouquets. The plant now exhibited, which is in good health and covered with bloom, was of small size, growing in a small pot, about six months ago, and in bad health; but one large shift and a higher temperature brought it to its present luxuriant state.”

Certificates : 1. To Messrs. Veitch and Son, of Exeter, for plants of *Lycaste Skinneri* and *Barbacenia squamata*. 2. To Mr. Ayres, gardener to C. L. Stephens, Esq., for two brace of Cucumbers, the longest measuring 19 inches in length; they were grown in a pit heated on Penn's system.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Chysis bractescens*, *Epidendrum Stamfordianum*, sent to the Society from Guatemala, by Mr. Hartweg; *Phycella ignea*; and *Arctostaphylos pungens*, a half-hardy evergreen shrub, introduced from Mexico by Mr. Hartweg.

BOOKS PRESENTED.

The Floricultural Cabinet for March. From Mr. Jos. Harrison.

The Journal of the Royal Geographical Society of London, vol. 13, part 1. From the Society.

The Botanical Register for March. From the Publishers.

The Athenæum for February. From the Editor.

The Table Fruits of India (4 Nos.) From the Earl of Auckland.

March 18, 1844. (REGENT STREET.)

ELECTION. Mr. W. Cock, Jun., Chiswick.

READ, a communication respecting *Oxalis Deppei* by Mr. Cockburn, gardener to the Earl of Mansfield, at Kenwood. Mr. Cockburn stated that he had grown this esculent for several years, and was convinced that if attention is paid to its cultivation it will be found very useful in the months of October, November, and December; but it requires a longer season of fine weather than our climate affords to bring its roots to maturity. The bulbs should be potted as early in spring as circumstances will permit; and as they vegetate in a low temperature, the pots may be placed in a peach-house, green-house, or even in a cold frame: but they must not be turned out of doors until all danger of frost is over. They thrive best in a light sandy soil in a southern exposure; the bulbs may be planted from nine to twelve inches apart each way, and should be so arranged that they may be protected from the early frosts of October and November by a slight covering of straw, mats, or spare lights. As eight or ten good roots are sufficient for a dish, there may be two or three dishes a week for three or four months, which is a great acquisition to a family at that season.

AWARDS. *Knightian Medal* to Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for handsome specimens of *Epidendrum rhizophorum*, *Illicium religiosum*, *Dendrobium secundum*, and a plant of *Cyrtopodium Andersonii*.

Certificates: 1. To C. B. Warner, Esq., for *Camarotis purpurea*. 2. To Mr. Plant, gardener to J. H. Schroder, Esq., for a specimen of *Vanda cristata*. 3. To Mr. Doran, gardener to T. Hawes, Esq., for a brace of Cucumbers measuring 19 inches in length.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Oncidium ampliatum*, sent from Guatemala by Mr. Hartweg; *Franciscea Hopeana*, *Dendrobium Heyneanum*, *Euphorbia melanthera*, and three *Cinerarias*: the first drained with charcoal, the second top-dressed with the same material, and the third, besides being top-dressed with charcoal, manured with one tea-spoonful of Harris's liquid manure in a pint of water, on the 5th of February. With these differences, the plants were treated in every respect the same. The first was the smallest, and the leaves were of a pale yellow green; the second was larger, and the foliage was of a deeper shade;

the third, being the one that had received the liquid manure in addition to the top-dressing of charcoal, was the largest, and the leaves were of a very healthy dark green; but that this resulted from the use of the liquid manure was not perfectly ascertained.

BOOKS PRESENTED.

The Florist's Journal for March. From the Editor.
Paxton's Magazine of Botany for March. From the Editor.

April 2, 1844. (REGENT STREET.)

ELECTION. Arthur Pryor, Esq., Brewery, Spitalfields, and Wandsworth.

AWARDS. *Knightian Medals*: 1. To Mr. Paxton, of Chatsworth, for a large specimen of *Dendrobium Paxtoni*. 2. To Messrs. Loddiges, of Hackney, for a fine plant of *Dendrobium macrophyllum*. 3. To Mr. J. Robertson, gardener to Mrs. Lawrence, for fine plants of *Cyrtopodium Andersonii*, *Maxillaria Harrisonii*, *Brassia Wrayæ*, and the larger flowered variety of *Oncidium ampliatum*.

Banksian Medal to Mr. Green, gardener to Sir Edmund Antrobus, Bart., for a most beautiful specimen of the larger flowered variety of *Erica cristata*.

Certificate: To Messrs. Henderson, of Pineapple Place, for a plant of the New Holland shrub *Dillwynia tenuifolia*.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Echeveria rosea*, a green-house plant sent to the Society by Mr. Hartweg from Mexico, and a flower of *Aristolochia Gigas*, or "Pilate's nightcap," a twining stove-plant, which bears singular dingy concave blossoms having considerable resemblance to those of *A. fetens*, but much larger, and assuming more the appearance of a cap.

BOOKS PRESENTED.

The Florist's Journal, No. 55. From the Editor.
The Botanical Register for April. From the Publishers.
The Floricultural Cabinet for April. From the Editor.
Prodromus Systematis Naturalis Regni Vegetabilis, part 8. From M. Alphonse De Candolle.
On the Cultivation of the Cucumber in the Winter Season. From the Author, Mr. Thomas Moore, Royal Botanic Garden, Regent's Park.

April 16, 1844. (REGENT STREET.)

ELECTIONS. A. Bayley, Esq., of Twickenham Park; W. R. Browne, Esq., of Chisledon, Wilts, and 2, Devonport Street,

Hyde Park ; T. Coventry, Esq., 5, Lincoln's Inn Old Square, and Swindon, Wilts ; and E. N. Buxton, Esq., Leytonstone, and Spitalfields Brewery.

AWARDS. *Knightian Medals*: 1. To Messrs. Henderson, of Pine-apple Place, for Camellia Bruceana ; a specimen composed of Azalea lateritia and A. Gladstonesii inarched upon the old A. Indica, forming a very dwarf plant with showy red and white blossoms ; and 50 varieties of Hyacinths in pots. 2. To Mr. J. Robertson, gardener to Mrs. Lawrence, for various Orchids, especially Oncidium altissimum and Coryanthes speciosa. 3. To Mr. Hutchison, gardener to E. J. Shirley, Esq., of Eatington Park, for remarkably fine specimens of Noblesse Peaches, which were forced on small trees growing in pots.

Banksian Medal to O. F. Meyrick, Esq., of Bodorgan Hall, Anglesea, for a dish of fine-looking ripe Cherries.

Certificates: 1. To Mr. Kennington, gardener to F. G. Cox, Esq., for a fine specimen of Cattleya Skinneri. 2. To Mr. Dawson, of Brixton Hill, for a beautiful specimen of Erica Hartnelli. 3. To the Very Rev. the Dean of Manchester, for a white Camellia, named Candor, concerning which Mr. Herbert says "It is the most perfect, I believe, raised in Europe ; its leaves are very like the Buff Camellia, and flowers usually larger than that sent, which is the first of the season, for it has the peculiarity of pushing its leaves before, or as it flowers, which makes the flower face outwards."

NOVELTIES FROM THE SOCIETY'S GARDEN. Berberis pallida, sent from Mexico by Mr. Hartweg ; it is not hardy, and requires to be kept in a greenhouse. Clerodendrum hastatum, having large halbert-shaped leaves, the undersides of which are of a fine purplish brown ; and Spiraea Reevesiana, a handsome hardy shrub, introduced from China, having pretty white blossoms ; it grows freely in the open air, and forms a good addition to the arboretum.

BOOKS PRESENTED.

Mémoires présentés par divers Savants à l'Académie Royale des Sciences de l'Institut de France, vol. 8. From the Academy of Sciences, at Paris.

Mémoires de la Société de Physique et d'Histoire Naturelle de Genève, t. 10, part 1. From the Society.

Mémoires de la Société d'Horticulture du Département de Seine et Oise, vols. 1 and 2. From the Society.

Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, publiées par la Société Royale d'Agriculture, &c., de Lyon, vol. 5. From the Society.

The Athenaeum for March. From the Editor.

Lichenum Helveticorum Spicilegium. By L. E. Schærer. (4to. Berne, 1823—1836.) From Col. May.

May 1, 1844. (REGENT STREET.—ANNIVERSARY.)

The following Fellows of the Society, viz.—

The Lord Prudhoe,
Sir William Middleton, Bart.,
Sigismund Rucker, Esq.,

were elected new Members of the Council, in the room of—

Edward Barnard, Esq.,
The Earl of Dartmouth, and
The Earl of Ilchester.

The following Fellows of the Society were re-elected Officers for the ensuing year, viz.—

The Duke of Devonshire, President,
Thomas Edgar, Esq., Treasurer, and
Alexander Henderson, M.D., Secretary.

The Auditors presented the following Report :—

“ The Auditors have to report to the General Meeting of the Horticultural Society of London, on this the thirty-fifth Anniversary, that they have examined the accounts for the past year with the vouchers, and find them to be correct.

“ By the annexed Statement of Receipts, Disbursements, and Liabilities, it will be seen that the Auditors have much reason to congratulate the Society on its increasing prosperity, especially as regards the material reduction of the outstanding debt,* and the future saving that will be effected by the decrease in the interest (to be paid thereon) from 5 to 4 per cent. per annum.

“ Wm. M. NURSE.
“ SIGIS. RUCKER, JUN.
“ F. J. DELAFOSSE.

“ 21, *Regent Street, April 22, 1844.*”

* This reduction amounts to the sum of £1428 5s. 1d.

ABSTRACT OF RECEIPTS AND EXPENDITURE
Between the 1st of April, 1843, and 31st of March, 1844.

RECEIPTS.

	£. s. d.	£. s. d.
To admission fees from Fellows, 51 at 6 Guineas each	321 6 0	By rents, rates, taxes, &c. Regent Street and Chiswick
To compositions for life from ditto, 10 at 40 Guineas each	420 0 0	By repairs of house in Regent Street
To subscriptions received from ditto, &c.—		By furniture and repairs
38 at 1 Guinea each	£39 18 0	By housekeeping expenses, Regent Street
5 at 1 1/4 Ditto	7 17 6	By salaries and collector's poundage
73 at 2 Guineas	153 6 0	By interest on bonded debt (bonds now cancelled)
189 at 3 Ditto	595 7 0	By cost of publishing Transactions
609 at 4 Ditto	2557 16 0	By library charges, for books, binding, &c.
1 at 10 Guineas (Winchester Horticultural Society).	10 10 0	By printing, stationery, and stamps
To amount of Transactions sold	—————	By medals and rewards at Ordinary meetings in Regent-st.
To rent of apartments let off in Regent Street	121 18 9	By cost of foreign missions and importations
To Garden produce sold	20 0 0	By expenses of meetings, postage, &c.
To charges to Fellows for packing plants, &c.	24 4 6	By miscellaneous expenses in Regent Street
To miscellaneous receipts	60 19 6	By ditto at the Garden, for seeds, plants, carriage, &c.
To amount bequeathed to the Society by the late Thomas Botfield, Esq., being the value of a Life Subscription	42 0 0	By implements, mats, &c.
To Garden Exhibition account, viz.—	£5149 18 0	By garden tan, dung, manful, &c.
Amount of Receipts		By expenses of Distribution department
Deduct:		By Garden current labour
Cost of Medals awarded £790 10 0		By repairs, alterations, &c. to Stoves, Greenhouses, &c. at the Garden
General Expenses of the three meetings	1461 12 4	By coals and coke for Garden
	—————	By Debt on open accounts due April 1, 1843
	2252 2 4	Less Discounts, &c.
	—————	£3515 9 10
	2897 15 8	—————
	—————	3569 9 10
	7284 9 9	By Bonded Debt
To Balance at Banker's April 1, 1843	£242 5 2	By Balance at Banker's, April 1, 1844
To do. in hands of Vice-Secretary do.	. 40 0 2	By ditto in hands of Vice-Secretary do.
	—————	—————
	282 5 4	. 4 2 10
	—————	—————
	7566 15 1	326 4 0
		—————
		7566 15 1
		11,137 4 9

EXPENDITURE.

	£. s. d.	£. s. d.	£. s. d.
By rents, rates, taxes, &c. Regent Street and Chiswick	212 3 5	Unpaid.	395 16 3
By repairs of house in Regent Street	16 18 0	. 30 11 8	
By furniture and repairs	6 3 1		
By housekeeping expenses, Regent Street	34 8 10		
By salaries and collector's poundage	986 15 8		
By interest on bonded debt (bonds now cancelled)	149 18 2		
By cost of publishing Transactions	186 7 8		
By library charges, for books, binding, &c.	22 13 3		
By printing, stationery, and stamps	92 3 2		
By medals and rewards at Ordinary meetings in Regent-st.	31 5 0		
By cost of foreign missions and importations	193 11 0		
By expenses of meetings, postage, &c.	136 16 0		
By miscellaneous expenses in Regent Street	47 4		
By ditto at the Garden, for seeds, plants, carriage, &c.	114 10 3		
By implements, mats, &c.	40 15 5		
By garden tan, dung, manful, &c.	50 19 7		
By expenses of Distribution department	168 18 3		
By Garden current labour	1154 13 9		
By repairs, alterations, &c. to Stoves, Greenhouses, &c. at the Garden	376 8 4		
By coals and coke for Garden	89 11 6		
By Debt on open accounts due April 1, 1843	4372 11 8		
Less Discounts, &c.	1445 14 4		
		1417 19 5	2091 10 5
		. 3537 4 9	
		7600 0 0 *	
		7240 11 1	
		. 326 4 0	
		7566 15 1	11,137 4 9

* Bonds to this amount have been cancelled by the issue of Promissory notes at 4 per Cent.

May 7, 1844. (REGENT STREET.)

ELECTIONS. The Earl of Leicester, Holkham, Norfolk ; P. Greenall, Esq., M.P., York Villa, New Brighton, Cheshire, and 45, Pall Mall ; and J. Shepherd, Esq., Kensington-Square.

AWARDS. *Knightian Medals*: 1. To Messrs. Loddiges, of Hackney, for various Orchids, especially a remarkable specimen of *Dendrobium densiflorum*, and a beautiful plant of *Cattleya Skinneri*. 2. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a large *Hovea Celsi*, a dwarf bushy specimen of *Chorozema Dicksoni*, *Dendrobium aggregatum*, and *Tetranema mexicanum*.

Banksian Medals: 1. To Mr. Plant, gardener to J. H. Schroder, Esq., for a fine plant of *Aerides crispum*. 2. To S. Rucker, Esq., of Wandsworth, for a fine specimen of *Anguloa Clowesii*.

Certificates: 1. To Mr. Carson, gardener to W. Farmer, Esq., for a variety of *Epidendrum macrochilum*. 2. To Mr. W. P. Ayres, gardener to J. Cook, Esq., of Brooklands, for a plant of *Pentas carnea*. 3. To Messrs. Veitch and Son, of Exeter, for a new hardy *Oxalis*, sent from Chili by their collector Mr. Lobb. 4. To Mr. Errington, gardener to Sir P. G. Egerton, Bart., for a series of flowers of seedling Cacti, especially one named *Regalis*, resembling Conway's Giant, and another named *Longissima*. 5. To Mr. Chapman, of Clapham, for a basket of Dutch Sweetwater Grapes, some bunches of which weighed three-quarters of a pound. 6. To Mr. Fish, gardener to H. H. Oddie, Esq., for a Cantaloupe Melon, a seedling of his own, together with a green-fleshed variety, concerning which Mr. Fish stated that they had been grown in a three-light box, on a bed formed of billet and rubbish wood, about two feet deep, with six inches of long litter spread regularly over them. Above this were placed eighteen inches of leaves and dung. The soil was the top spit from a common, and was strong loam. It was put in as rough as possible, and trodden firm. The plants were watered twice with the drainings of the dunghill, and once with guano mixed with water, at the rate of one ounce to a gallon of water. No other manure was used.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Comarostaphylis arbutooides*, and *Arctostaphylos nitida*, two pretty half-hardy Mexican shrubs, having some resemblance to an *Arbutus*.

BOOKS PRESENTED.

- The Floricultural Cabinet for May. From Mr. Jos. Harrison.
 The Florist's Journal, No. 56. From the Editor.
 The Botanical Register for May. From the Publishers.
 The Athenaeum for April. From the Editor.
 Archives du Muséum d'Histoire Naturelle, tom. 3, liv. 4. From the Museum.
 The Ladies' Flower Garden of Ornamental Perennials, Nos. 27 and 28. From Mrs. London.
 Transactions of the American Philosophical Society, held at Philadelphia, vol. 9, part 1. From the Society.

May 18, 1844. (GARDEN EXHIBITION.)

THE weather upon this occasion was very unfavourable, the morning being ushered in by a frost of as much as 6° in some localities, accompanied by a sharp north-east wind; occasional storms of rain prevailed throughout the day. Notwithstanding the severity of the weather 4367 visitors entered the Garden, exclusive of exhibitors.

The AWARD was as follows :* *Large Gold Medal* : 1. To Mr. Mylam, gardener to Sigismund Rucker, Esq., Jun., F.H.S., for a collection of Exotic Orchidaceæ.

Gold Knightian Medals : 1. To Mr. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of thirty stove and greenhouse plants. 2. To the same for a collection of Exotic Orchidaceæ. 3. To Mr. Brewin, gardener to R. Gunter, Esq., F.H.S., for a miscellaneous collection of Fruit.

Gold Banksian Medals : 1. To Mr. Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for a collection of fifteen stove and greenhouse plants. 2. To Mr. W. Cock, of Chiswick, for twelve varieties of Pelargonium, in pots of

* During this season the following instructions were given to the Judges :

" In forming your opinion of the subjects submitted to you for examination, you are requested to take into consideration whether they have been exhibited previously or not. The OBJECT of this regulation is to give specimens produced at the Society's Garden Meetings, for the first time, an advantage over others previously exhibited, although of equal merit; and to obstruct the system of exhibiting very fine plants repeatedly, to the disadvantage of others. The EFFECT of this regulation should be—1. That if two collections should be nearly the same in point of merit otherwise, that in which no previously exhibited specimen shall be found will be regarded as the better of the two. 2. That in all cases of doubt, the person who had not exhibited previously shall have the benefit of the doubt. 3. That when each of two competitors shall have introduced previously exhibited plants into his collection, that collection which contains the fewest of them shall be deemed the superior if they are otherwise nearly alike. It is not, however, wished that the previous exhibition of plants should depreciate their value so much as to place a superior collection below one very decidedly inferior. The APPLICATION of this regulation is left to your judicious consideration."

twenty-four to the east. 3. To Messrs. Lane and Son, of Great Berkhamstead, for twenty-five varieties of Roses in pots. 4. To Mr. Dobson, gardener to Mr. Beck, of Isleworth, F.H.S., for a collection of twelve varieties of Roses in pots. 5. To Messrs. Rollisson, of Tooting, for a collection of Exotic Orchidaceæ. 6. To Mr. Kennington, gardener to F. G. Cox, Esq., for six species of Exotic Orchidaceæ. 7. To Mr. Green, for twelve greenhouse Azaleas. 8. To Mr. Brazier, gardener to W. H. Story, Esq., F.H.S., for twenty varieties of Cape Heaths. 9. To Mr. Green, for Tall Cacti in flower. 10. To Mr. Spencer, gardener to the Marquis of Lansdowne, F.H.S., for a miscellaneous collection of fruit.

Silver Gilt Medals: 1. To Mr. Clarke, gardener to the Earl of Eldon, at Shirley Park, Croydon, for a collection of fifteen stove and greenhouse plants. 2. To Mr. Bruce, gardener to Boyd Miller, Esq., for a collection of six stove and greenhouse plants. 3. To Mr. Robertson, for a collection of stove and greenhouse climbers. 4. To Mr. Gaines, of Battersea, for twelve varieties of Pelargonium, in pots of twenty-four to the east. 5. To Mr. Dobson, for the same. 6. To Mr. Gaines, for twelve varieties of Pelargonium, in pots of twelve to the east. 7. To Mr. Cock, for the same. 8. To Mr. Laing, nurseryman, Twickenham, for a collection of twenty-five Roses in pots. 9. To Alexander Rowland, Esq., F.H.S., for a collection of twelve Roses in pots. 10. To Mr. Williams, gardener to C. B. Warner, Esq., F.H.S., for a collection of Exotic Orchidaceæ. 11. To Mr. Robertson, for a collection of twenty species of Cape Heaths. 12. To Mr. J. W. Dawson, of Brixton, for the same. 13. To Mr. T. Jackson, F.H.S., for the same. 14. To Mr. Vockes, gardener to J. J. Wells, Esq., of Bromley, Kent, for a collection of six species of Cape Heaths. 15. To Mr. Frazer, of Leyton, Essex, for the same. 16. To Mr. Falconer, gardener to Archdale Palmer, Esq., of Cheam, for twelve greenhouse Azaleas. 17. To Mr. Robertson, for six greenhouse Azaleas. 18. To Mr. Upright, gardener to G. C. Ridge, Esq., for Tall Cacti in flower. 19. To Mr. Booth, gardener to Sir Charles Lemon, Bart., F.H.S., for *Cereus crenatus*. 20. To Mr. J. Wilmot for Grapes. 21. To Mrs. Knott, of Bohun Lodge, Barnet, for the same.

Large Silver Medals: 1. To Mr. Frazer, of Leyton, for a collection of six species of stove and greenhouse plants. 2. To Mr. Catlegh, for twelve varieties of Pelargonium, in pots of twenty-four to the east. 3. To Mr. Staines, for the

same. 4. To Mr. Bell, of Chelsea Hospital, for twelve varieties of *Pelargonium*, in pots of twelve to the east. 5. To Mr. Catleugh, for the same. 6. To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for six *Calceolarias*, in pots of twelve to the east. 7. To Mr. Cole, gardener to C. Lewis, Esq., of Blackheath, for twelve varieties of *Fuchsia*. 8. To Messrs. Lane and Son, for a collection of Roses in fifty varieties. 9. To Mr. Green, for a collection of twenty species of Cape Heaths. 10. To Mr. Bruce, for a collection of six species of Cape Heaths. 11. To Mr. Gaines, of Battersea, for twelve greenhouse Azaleas. 12. To Mr. Bruce, for Tall Cacti in flower. 13. To Mr. Robertson, for the same. 14. To Messrs. Veitch and Co., of Exeter, for *Hindsia violacea*. 15. To Mr. Moore, gardener to R. Hanbury, Esq., F.H.S., for a new variety of *Schomburgkia tibiciniflora*. 16. To Mr. Williams, gardener to C. B. Warner, Esq., F.H.S., for plants grown in a glass case on Mr. Ward's plan. 17. To Mr. Dodds, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of fruit. 18. To the same, for Grapes. 19. To Mr. Wortley, gardener to I. F. Maubert, Esq., F.H.S., for Grapes. 20. To Mr. J. Davis, of Oak Hill, East Barnet, for the same. 21. To Mr. G. Leslie, gardener to J. Fleming, Esq., F.H.S., for Pine Apples.

Silver Knightian Medals: 1. To Mr. Stanly, for a collection of six stove and greenhouse plants. 2. To Mr. Frazer, for a collection of six stove and greenhouse climbers. 3. To Mr. J. Mitchell, Piltdown Nursery, Maresfield, for a collection of Roses, in twenty-five varieties. 4. To Mr. Gaines, for six *Calceolarias*, in pots of twelve to the east. 5. To Mr. Catleugh, for a collection of twelve varieties of *Fuchsia*. 6. To Mr. Edmonds, gardener to his Grace the Duke of Devonshire, at Chiswick, for *Peristeria pendula*. 7. To Messrs. Veitch and Son, of Exeter, for *Eriostemon buxifolium*. 8. To Messrs. Veitch and Son, for *Erica depressa*. 9. To Mr. Green, for *Ixora coccinea*. 10. To Mr. Bruce, for *Pimelea spectabilis*. 11. To Mr. G. Clarke, gardener to the Earl of Eldon, for *Leschenaultia formosa*. 12. To Mr. Robertson, for *Stephanotus floribundus*. 13. To Messrs. Veitch and Son, for a new species of *Centrosema*. 14. To Messrs. Loddiges, of Hackney, for a species of *Gaylussacia*. 15. To Mr. W. Brazier, for the best named collection, (*no error in 20 plants, and well written.*) 16. To Mr. Sellers, gardener to L. V. Watkins, Esq., F.H.S., for Grapes. 17. To Mr. Mitchell, of Kemp Town, Brighton, for the same. 18. To Mr. Braid, gar-

dener to H. Perkins, Esq., F.H.S., for Pine Apples. 19. To Mr. Ewing, gardener to O. F. Meyrick, Esq., F.H.S., for Cherries. 20. To Mr. Spencer, for Strawberries (British Queen). 21. To Mr. Gadd, of Betchworth, near Dorking, for five Melons. 22. To Mr. Falconer, gardener to A. Palmer, Esq., for Azalea variegata. 23. To the same, for Leschenaultia grandiflora.

Silver Banksian Medals: 1. To Mr. Catleugh, for a collection of twenty-five Roses in pots. 2. To A. Rowland, Esq., F.H.S., for a collection of Roses, in twenty-five varieties. 3. To Mr. Ivery, of Peckham, for twelve varieties of Cineraria in pots. 4. To Messrs. Veitch and Son, for Xanthosia rotundifolia. 5. To the same, for Hindsia (Rondeletia) longiflora. 6. To Mr. Forrest, for Statice macrophylla. 7. To Mr. Robertson, for Cereus speciosissimus. 8. To the same, for Gompholobium polymorphum. 9. To the same, for Eriostemon buxifolium. 10. To Mr. Noble, gardener to R. Mangles, Esq., F.H.S., for a new species of Hibbertia. 11. To Mr. Robertson, for the second best named collection, (*two errors in 36 plants, and very nicely written.*) 12. To Mr. M'Lean, gardener to the Marquis of Downshire, for Grapes. 13. To Mr. Atlee, gardener to H. Beaufoy, Esq., of South Lambeth, for the same. 14. To Mr. Snow, gardener to the Earl de Grey, for Melons. 15. To Mr. Dodds, for Strawberries (British Queen). 16. To Mr. I. Davis, of Oakhill, for the same. 17. To R. Brook, Esq., F.H.S., for Apples, &c.

Certificates of merit: 1. To Messrs. Lawrence, of Parliament-Street, for Plants grown under a bell glass on Mr. Ward's plan. 2. To Mr. Bruce, for Adenandra speciosa. 3. To the same, for Siphocampylus betulifolius. 4. To Mr. Whomes, gardener to E. Foster, Esq., of Clewer, for a seedling Pelargonium (Dr. Lindley). 5. To Mr. I. Ivery, of Betchworth, for a seedling Azalea (formosa). 6. To Mr. Catleugh, for a seedling Azalea (conspicua rosea). 7. To Mr. Frost, gardener to Lady Grenville, for Cumingia trimaculata. 8. To Mr. Mylam, for the third best named collection, (*four errors in 36 plants, and beautifully written.*) 9. To Mr. Rollisson, of Tooting, for the fourth best named collection, (*four errors in 20 (?) plants, and well written.*) 10. To Mr. W. Davis, of Isleworth, for Strawberries (British Queen).

* * * The Judges of the Plants exhibited as new, or extremely rare single specimens, expressed their regret that, owing to mis-entries, they were unable to confer rewards upon some deserving exhibitors.

June 4, 1844. (REGENT STREET.)

ELECTIONS. Miss E. Holmes, of Denmark Hill, Camberwell, and S. Lowdell, Esq., Bedale, Lindfield, Sussex, as *Fellows*; and Dr. R. Wight, Dr. A. Gibson, Dr. H. J. Giraud, Dr. Riedel, Col. Sheil, Major Rawlinson, W. Griffith, Esq., and G. Gardner, Esq., as *Corresponding Members*.

AWARDS. *The large Silver Medal* to Messrs. Loddiges, of Hackney, for a specimen of the new *Epacris miniata*.

Knightian Medals. 1. To Messrs. Rollisson, of Tooting, for *Aerides maculosum*. 2. To Messrs. Loddiges, of Hackney, for the new *Dendrobium Dalhousieanum*, a large mass of *Cattleya Mossiae* and *Lælia majalis*.

Banksian Medals: 1. To W. C. Alston, Esq., of Birmingham, for a specimen of the rare *Oncidium concolor*. 2. To Mr. Glendinning, of Chiswick Nursery, Turnham Green, for two seedling *Gloxiniyas*, with rose-coloured flowers.

Certificates: 1. To Mr. Fish, gardener to H. H. Oddie, Esq., of Barnet, for a capital green-fleshed Melon, weighing nearly 5lbs. 2. To the same, for a bunch of Grapes, of an apparently new variety, obtained between the White Frontignan and Dutch Sweetwater; it exhibited the long narrow bunch of the former with the larger berries of the latter; when tasted it proved to have an agreeable Muscat taste, and was considered a good sort.

NOVELTIES FROM THE SOCIETY'S GARDEN. A French Watering Pot for watering plants in sitting-rooms, or small thumb-pots, where great nicety in the application is required. It consisted of a hollow spindle-shaped tube, open at both points, one point being small, the other larger. When used, it is plunged into water, which enters the machine and expels the air; the thumb is then placed over the wider aperture, and the lower is presented to the part that is to be watered; so long as the thumb is pressed upon the upper aperture, the weight of the atmosphere is removed, and no water will run out; but as soon as the thumb is lifted up, a stream descends upon the plant, and continues to do so till the thumb is replaced or the vessel is emptied.

BOOKS PRESENTED.

Floricultural Cabinet for June. From Mr. Jos. Harrison.

The Florist's Journal, No. 57. From the Editor.

The Botanical Register for June. From the Publishers.

The Ladies' Flower Garden of Ornamental Perennials, No. 29. From Mrs. Loudon.

The Athenæum for May. From the Editor.

June 15, 1844. (GARDEN EXHIBITION.)

The number of visitors upon this occasion, exclusive of exhibitors, amounted to 13,517. The weather was particularly fine.

The AWARD was as follows :

Large Gold Medal: 1. To Mr. Mylam, gardener to Sigismund Rucker, Esq., jun., F.H.S., for a collection of Exotic Orchidaceæ.

Gold Knightian Medals: 1. To Mr. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of thirty Stove and Greenhouse plants. 2. To the same for a collection of Exotic Orchidaceæ. 3. To Mr. Redding, gardener to Mrs. Marryat, F.H.S., for six species of Exotic Orchidaceæ. 4. To Mr. M. Henderson, gardener to Sir George Beaumont, Bart., for a miscellaneous collection of Fruit.

Gold Banksian Medals: 1. To Mr. Cock, F.H.S., of Chiswick, for twelve varieties of Pelargonium, in pots of twenty-four to the cast. 2. To Mr. Gaines, of Battersea, for the same. 3. To Mr. Dobson, for twelve varieties of Roses in pots. 4. To Mr. Lane, for twenty-five varieties of Roses in pots. 5. To Messrs. Rollisson, of Tooting, for six species of Exotic Orchidaceæ. 6. To Mr. Robertson, for twenty varieties of Cape Heaths. 7. To Mr. Jackson, of Kingston, F.H.S., for the same. 8. To Mr. Robertson, for tall Cacti in flower. 9. To Mr. I. Spencer, gardener to the Marquis of Lansdowne, F.H.S., for a miscellaneous collection of Fruit.

Silver Gilt Medals: 1. To Mr. John Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for a collection of fifteen Stove and Greenhouse plants. 2. To Mr. Robertson, for a collection of Stove and Greenhouse climbers. 3. To Mr. Dobson, gardener to Mr. Beck, of Isleworth, for twelve varieties of Pelargonium, in pots of twenty-four to the cast. 4. To Mr. Catleugh, of Hans-place, Chelsea, for the same. 5. To Mr. Gaines, for twelve varieties of Pelargonium, in pots of twelve to the cast. 6. To Mr. Parker, gardener to J. H. Oughton, Esq., for the same. 7. To Messrs Paul and Son, of Cheshunt, for a collection of twenty-five varieties of Roses in pots. 8. To Mr. P. N. Don, gardener to G. F. Cox, Esq., of Stockwell, for six species of Exotic Orchidaceæ. 9. To Messrs. Veitch, of Exeter, for *Oncidium Lanceanum*. 10. To Messrs. Rollisson, of Tooting, for twenty varieties of Cape Heaths. 11. To Mr. Falconer, gardener to Archdale Palmer, Esq., of Cheam, for tall Cacti in flower. 12. To Mr. Ingram, Royal Gardens,

Windsor, for Veronica speciosa. 13. To Messrs. Loddiges, of Hackney, for Epacris miniata. 14. To Mr. M. Henderson, for Grapes. 15. To Mr. Thompson, gardener to Sir I. L. Goldsmid, F.H.S., for the same. 16. To Mr. Dodds, gardener to Col. Baker, of Salisbury, F.H.S., for Pine Apples.

Large Silver Medals: 1. To Mr. Coysh, gardener to R. Hudson, Esq., of Clapham-common, for twelve varieties of Pelargonium, in pots of twenty-four to the east. 2. To Mr. W. Cock, for twelve varieties of Pelargonium, in pots of twelve to the east. 3. To Mr. Catleugh, for the same. 4. To Alexander Rowland, Esq., F.H.S., for a collection of twelve varieties of Roses in pots. 5. To Messrs. Cobbett, of Chobham, near Bagshot, for twenty-five varieties of Roses in pots. 6. To Mr. A. Milne, gardener to C. S. Chauncey, Esq., F.H.S., for a collection of Roses in fifty varieties. 7. To Mr. Rivers, F.H.S., for the same. 8. To Mr. Green, for six varieties of Cape Heaths. 9. To Mr. Dawson, of Brixton Hill, for the same. 10. To Mr. Green, for Tall Caeti in flower. 11. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for six varieties of Calceolaria, in pots of twelve to the east. 12. To Mr. Gaines, for twelve varieties of Fuchsia. 13. To Mr. Falconer, for Brassia caudata. 14. To Mr. S. Carson, gardener to W. F. G. Farmer, Esq., F.H.S., for Cattleya Mossiae. 15. To Mr. Glendinning, F.H.S., for Clerodendron infortunatum. 16. To Mr. Dodds, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of Fruit. 17. To Mr. Frost, gardener to the Lady Grenville, F.H.S., for Grapes. 18. To Mr. E. Mitchell, of Kemp Town, near Brighton, for Grapes. 19. To Mr. M. Henderson, for Pine Apples. 20. To Mr. Wharton, gardener to Miss Whitehead, of Weston, Bath, for the same.

Silver Knightian Medals: 1. To Mr. Bromley, gardener to Miss Anderdon, of the Upper Mall, Hammersmith, for a collection of twelve varieties of Pelargonium, in pots of twelve to the east. 2. To Mr. T. Rivers, of Sawbridgeworth, F.H.S., for a collection of Roses in twelve varieties. 3. To Mr. A. Milne, for the same. 4. To Mr. Parsons, gardener to A. George, Esq., of Enfield, for a collection of Roses in fifty varieties. 5. To Messrs. Paul and Son, for the same. 6. To Messrs. Lee, of Hammersmith, for the same (*a Certificate of merit was given in addition, on account of good arrangement.*) 7. To Mr. Butterly, gardener to F. R. Symons, Esq., of Norbiton Park, Surrey, for a collection of Roses in twenty-five varieties. 8. To Mr. Gaines, for six varieties

of Calceolarias, in pots of twelve to the cast. 9. To Messrs. Norman, of Woolwich, for a collection of twenty-four varieties of Pinks. 10. To Mr. R. Laing, of Twickenham, for twelve varieties of Fuchsia. 11. To Mr. Robertson, for Erica depressa. 12. To the same, for Erythrina Crista Galli. 13. To Messrs. Lucombe and Pince, of Exeter, for Cyrtoceras reflexum. 14. To Messrs. Tyso and Son, Wallingford, Berks, for a large collection of Ranunculus. 15. To Mr. Brazier, gardener to W. H. Story, Esq., F.H.S., for a collection of Seedling Heaths. 16. To Messrs. Lucombe and Pince, for Ixora acuminata. 17. To Mr. Glendinning, F.H.S., for Achimenes picta. 18. To Mr. Smith, the Royal Botanic Gardens, Kew, for Pterodiscus speciosus. 19. To Mr. Robertson, for the best-named collection, (*one error in thirty plants.*) 20. To Mr. Parsons, gardener to A. George, Esq., of Enfield, for Grapes. 21. To Mr. Davis, gardener to Abel Smith, Esq., F.H.S., for Pine Apples. 22. To Mr. M. Henderson, for Nectarines. 23. To Mr. Fleming, gardener to his Grace the Duke of Sutherland, F.H.S., for Peaches. 24. To Mr. Foggo, gardener to the Marquis of Abercorn, the Priory, Stanmore, for Peaches. 25. To Mr. Terry, gardener to Lady Puller, for three Melons (Anderson's Green Flesh).

Silver Banksian Medals: 1. To Mr. Bowen, gardener to Sir E. Paget, Chelsea Hospital, for six varieties of Pelargonium, in pots of eight to the cast. 2. To Mr. Lane, of Great Berkhamstead, F.H.S., for a collection of Roses in twelve varieties. 3. To Mr. Slowe, gardener to W. R. Baker, Esq., F.H.S., Bayford House, Herts, for a collection of Roses in fifty varieties. 4. To Mr. Lane, for the same. 5. To Messrs. Cobbett, of Chobham, near Bagshot, for the same. 6. To Mr. Dobson, for a collection of Roses in twenty-five varieties. 7. To Mr. Bennett, of Bath, for the same. 8. To Mr. Francis, of Hertford, for the same. 9. To Mr. Redding, for Tall Cacti in flower. 10. To Mr. H. Ward, of Woolwich, for a collection of twenty-four varieties of Pinks. 11. To Mr. Falconer, for Leschenaultia formosa. 12. To Mr. Ayres, gardener to J. Cook, Esq., F.H.S., for Pentas carneae. 13. To Mr. Dobson, for Achimenes grandiflora. 14. To Mr. Green, for a Grafted Azalea indica. 15. To Mr. Catleugh, for a Pelargonium (The Wonder). 16. To Mr. Robertson, for Gloxinia maxima alba. 17. To Mr. T. Jackson, for Dracophyllum secundum. 18. To Mr. Green, for Aphelexis humilis. 19. To Messrs. Rollisson, for the second best-named collection, (*no error in twenty plants.*) 20. To Mr. Dodds,

gardener to Sir George Warrender, Bart., for Grapes. 21. To Mr. John Wilmot, F.H.S., of Isleworth, for the same. 22. To Mr. Fielder, gardener to W. Linwood, Esq., F.H.S., for Pine Apples. 23. To Mr. R. Fish, gardener to Colonel Sowerby, F.H.S., for Peaches. 24. To Mr. Fleming, gardener to his Grace the Duke of Sutherland, F.H.S., for Peaches and Nectarines. 25. To Mr. Lidyard, of Batheaston, near Bath, for Strawberries. 26. To Mr. W. Carmichael, gardener to Mrs. Hawkins, of Bignor Park, Petworth, Sussex, for a Benares Melon.

The Certificate of Merit: 1. To Messrs. Cobbett, for a collection of Roses in twelve varieties. 2. To Alexander Rowland, Esq., F.H.S., for a collection of Roses in fifty varieties: (*this would have had a higher prize if the flowers had not been over blown.*) 3. To Mr. S. Hooker, of Brenchley, for the same. 4. To Mr. Laing, of Twickenham, for the same. 5. To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of Roses in twenty-five varieties. 6. To Messrs. Mountjoy and Son, of Ealing, for *Lilium testaceum*. 7. To Mr. Robertson, for *Erica ventricosa alba*. 8. To the same, for *Gesnera lateritia*. 9. To Mr. Green, for *Chorozema ovatum*. 10. To the same, for *Coleonema rubrum*. 11. To Mr. T. Jackson, F.H.S., for a collection of *Gloxinias*. 12. To the same, for *Viscaria oculata*. 13. To Mr. Beck, of Isleworth, for a seedling *Pelargonium (Desdemona)*. 14. To Mr. Hoyle, of Guernsey, for a seedling *Pelargonium (Titus)*. 15. To Mr. Whomes, gardener to E. Foster, Esq., of Clewer, near Windsor, for a seedling *Pelargonium (Exactum)*. 16. To the same, for a seedling *Pelargonium (Sir John Broughton)*. 17. To Mr. Mylam, for the third best-named collection (*four errors in twenty-seven plants, and remarkably well written*). 18. To Mr. Malpas, gardener to Mrs. Ormsby Gore, for a Providence Pine Apple. 19. To Messrs. Lee, of Hammersmith, for the skill with which their Roses were arranged.

July 2, 1844. (REGENT STREET.)

ELECTIONS. As an Honorary Member, His Majesty the King of Saxony. Also Sir T. Tancred, Brighton; J. B. Philips, Esq., 65, Wimpole Street, and Heath House, near Cheadle, Staffordshire; Dr. W. Speir, East Lodge, Acton, Middlesex; and Mr. F. C. Ball, Nurseryman, Taunton, as Fellows.

AWARDS. *A Knightian Medal* to Mr. Best, gardener to Alex-

ander Park, Esq., Merton Grove, Surrey, for *Alona cœlestis*, a new shrubby Nolanad, with large sky-blue flowers.

Banksian Medals: 1. To Mr. Frazer, gardener to E. D. Davenport, Esq., F.H.S., for a handsome Providence Pine, weighing 6 lbs. 2 oz.; 2. To Mr. Hendry, gardener to the Rev. W. Antrobus, for a Hoosainee Melon, weighing 12 lbs. 3 oz.

Certificates: To Mr. Jones, gardener to Sir Moore Disney, Bart., F.H.S., for a dish of Black Tartarian Cherries. 2. To Mr. S. Rylance, gardener to J. B. Glegg, Esq., F.H.S., for a Providence Pine Apple, weighing 4 lbs. 8 oz.

NOVELTIES FROM THE SOCIETY'S GARDEN. A plant of *Lindleya mespiloides*, an evergreen shrub, with large white fragrant flowers, from Mexico. It was reported not to be hardy enough to bear London winters.

The result of a trial of charcoal against bone-dust, as applied to Fuchsias, was produced in the form of two plants of *Fuchsia Chevalieri*: they were struck from cuttings in one pot, and were potted off on the 15th of February. A thumb-pot full of bone-dust was mixed with the soil in which one was potted; the other received the same quantity of charcoal; each was put in a 5-inch pot. For a few weeks the only difference was, that the one in bone-dust had leaves of a much darker colour than the other. Both were repotted on April 26th, into 9-inch pots, a 3-inch pot of bone-dust being then given to the one, and of charcoal to the other, in the same way as before; both plants had grown so much alike, that it was hardly possible to say which was best; and thus it appeared, that, good as bone-dust is, it is equalled by charcoal in the treatment of Fuchsias for specimen plants.

BOOKS PRESENTED.

- Flora Batava, No. 132. From His Majesty the King of Holland.
- The Ladies' Flower Garden of Ornamental Perennials, No. 30. From Mrs. London.
- The Botanical Register for July. From the Publishers.
- Proceedings of the Geological Society, No. 97. From the Society.
- Transactions of the Agricultural Society of Vienna, part 1, vol. 1, N.S. From the Society.
- Catalogue of the Trees, Shrubs, and Plants in the Royal Botanic Garden, Naples.
- Appendix 5 to the Flora Neapolitana, &c.
- Nuove Ricerche su la Caulinia Oceanica. From Signor M. Tenore, F.M.I.S.

July 13, 1844. (GARDEN EXHIBITION.)

The number of visitors at this meeting, exclusive of exhibitors, amounted to 4278. The day was inauspicious, the rain beginning to fall just as the company began to enter the gardens, and continuing with very little intermission during the afternoon.

The exhibition was by far the best that was ever seen in the Garden in July, and perhaps in some respects the finest of the season in which it was held. The fruit, as usual, formed the most remarkable feature.

The AWARD was as follows:—

Large Gold Medal: 1. To Mr. Mylam, gardener to Sigismund Rucker, Esq., jun. F.H.S., for a collection of Exotic Orchidaceæ.

Gold Knightian Medals: 1. To Mr. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of thirty Stove and Greenhouse plants. 2. To Messrs. Rollisson, of Tooting, for a collection of Exotic Orchidaceæ. 3. To Mr. Don, gardener to F. G. Cox, Esq., of Stockwell, for six species of Exotic Orchidaceæ. 4. To Mr. Spencer, gardener to the Marquis of Lansdowne, F.H.S., for a miscellaneous collection of Fruit.

Gold Banksian Medals: 1. To Mr. Frazer, of Leyton, Essex, for a collection of fifteen Stove and Greenhouse plants. 2. To Mr. Stains, of Middlesex Place, New Road, for twelve varieties of Pelargonium, in pots of twenty-four to the east. 3. To Mr. Catleugh, of Hans Place, Sloane Street, for the same. 4. To Mr. Dobson, gardener to Mr. Beck, of Isleworth, for twelve varieties of Roses in pots. 5. To Messrs. Lane and Son, of Great Berkhamstead, for twenty-five varieties of Roses in pots. 6. To Mr. Robertson, for a collection of Exotic Orchidaceæ. 7. To Mr. Redding, gardener to Mrs. Marryat, F.H.S., for six species of Exotic Orchidaceæ. 8. To Mr. Robertson for twenty varieties of Cape Heaths. 9. To Mr. T. Jackson, F.H.S., for the same. 10. To Mr. Henderson, gardener to Sir George Beaumont, Bart., for a miscellaneous collection of Fruit.

Silver Gilt Medals: 1. To Mr. W. Cock, F.H.S., of Chiswick, for twelve varieties of Pelargonium, in pots of twenty-four to the east. 2. To Mr. Gaines, of Battersea, for the same. 3. To Mr. Catleugh, for twelve varieties of Pelargonium, in pots of twelve to the east. 4. To Mr. Epps, of Maidstone, for a collection of fifteen Stove and Greenhouse plants. 5. To Mr. Bruce, gardener to Boyd Miller, Esq., for a collection of six Stove and Greenhouse plants. 6. To Mr. Fraser, for a collection of six Stove and Greenhouse Climbers. 7. To Mr. Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for a collection of twenty varieties of Cape Heaths. 8. To Messrs. Fairbairn, of Clapham, for the same. 9. To Mr. Bruce, for a col-

lection of six species of Cape Heaths. 10. To Mr. J. W. Dawson, of Brixton Hill, for the same. 11. To Messrs. Veitch and Son, of Exeter, for *Cattleya Loddigesii*. 12. To Mr. Robertson, for *Saurauja spectabilis*. 13. To Mr. Potts, of Shrewsbury, for plant-cases, on Mr. Ward's plan. 14. To Mr. Dytche, gardener to Sir F. Goodricke, of Studley Castle, Warwick, for Grapes. 15. To Mr. Hamp, gardener to James Thorne, Esq., of Mawbey House, South Lambeth, for the same. 16. To Mr. J. Davis, of East Barnet, for the same. 17. To Mr. Hamp, for Pine Apples. 18. To Mr. M'Ewen, gardener to Colonel Wyndham, of Petworth, for the same. 19. To Mr. Parsons, gardener to A. George, Esq., of Ponder's End, near Enfield, for the same. 20. To Mr. Brewin, gardener to R. Gunter, Esq., F.H.S., for the same.

Large Silver Medals: 1. To Mr. Green, for a collection of fifteen Stove and Greenhouse plants. 2. To Mr. Slowe, gardener to W. R. Baker, Esq., F.H.S., for a collection of six Stove and Greenhouse plants. 3. To Mr. Gaines, for twelve varieties of Pelargoniums, in pots of twelve to the east. 4. To Alexander Rowland, Esq., F.H.S., for a collection of Roses, in fifty varieties. 5. To Messrs. Paul and Son, of Cheshunt, for the same. 6. To Mr. Epps, for a collection of twenty species of Cape Heaths. 7. To Mr. J. Doran, gardener to T. Hawes, Esq., F.H.S., for a collection of six species of Cape Heaths. 8. To Mr. Fraser, for the same. 9. To Mr. C. Embleton, gardener to Thomas Barnard, Esq., of Park Terrace, North Brixton, for a collection of twenty-four varieties of Carnations. 10. To Messrs. Norman, of Woolwich, for the same. 11. To Mr. Embleton, for a collection of twenty-four varieties of Piccotees. 12. To Mr. Dickson, of Acre Lane, Brixton, for the same. 13. To Mr. Gaines, for a collection of twelve varieties of Fuchsia. 14. To Mr. Laing, of Twickenham, for the same. 15. To Mr. Dods, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of Fruit. 16. To Mr. Robinson, gardener to A. Sinclair, Esq., of Hill Side House, Liverpool, for Grapes. 17. To Mr. Ingram, gardener to Her Majesty, at Windsor, for Royal Albert Grapes. 18. To Mr. Wilmot, of Isleworth, F.H.S., for Grapes. 19. To Mr. T. Belton, gardener to Charles Winn, Esq., F.H.S., for Pine Apples. 20. To Mr. Wilmot, for the same.

Silver Knightian Medals: 1. To Mr. George Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of six Stove and Greenhouse plants. 2. To Messrs. Lane and

Son, for a collection of Moss Roses, in twelve varieties. 3. To Mr. N. Wilson, gardener to Earl Howe, F.H.S., for a collection of Roses, in fifty varieties. 4. To Messrs. Lane and Son, for the same. 5. To Mr. Buttery, gardener to F. R. Symons, Esq., of Norbiton Park, Kingston, for a collection of Roses, in twenty-five varieties. 6. To Mr. E. P. Francis, of Hertford, for the same. 7. To Mr. Glendinning, of Turnham Green, F.H.S., for a collection of six species of Cape Heaths. 8. To Mr. Willmer, of Sunbury, for a collection of twenty-four varieties of Carnations. 9. To G. Edmunds, Esq., of Wandsworth Road, for a collection of twenty-four varieties of Piccotees. 10. To Messrs. Norman, for the same. 11. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for twelve varieties of Fuchsia. 12. To Mr. Kendall, of Stoke Newington, for the same. 13. To Mr. Eyles, gardener to Sir George de Hochedepied Larpent, Bart., F.H.S., for Calanthe plantaginea. 14. To Messrs. Mountjoy and Son, of Ealing, for a collection of Lilium eximium. 15. To the same, for a collection of Gloxinias. 16. To Mr. Dobson, for a collection of Achimenes. 17. To Mr. Robertson, for Nepeutes distillatoria. 18. To Mr. Eyles, for Chiococca racemosa. 19. To Mr. Robertson, for the best named collection (*no error in thirty plants, and beautifully written*). 20. To Mr. Parker, gardener to J. H. Oughton, Esq., of Roehampton, for a miscellaneous collection of Fruit. 21. To Mr. Atlee, gardener to H. Beaufoy, Esq., of South Lambeth, for Grapes. 22. To Mr. Dods, for the same. 23. To Mr. Davis, gardener to Abel Smith, Esq., M.P., F.H.S., for the same. 24. To Mr. Smith, gardener to Sir Gore Ouseley, Bart., F.H.S., for the same. 25. To Mr. Mitchell, of Kemp Town, near Brighton, for the same. 26. To Mr. Sellers, gardener to L. V. Watkins, Esq., F.H.S., for Pine Apples. 27. To Mr. Davis, of East Barnet, for Nectarines. 28. To Mr. Snow, gardener to the Earl de Grey, F.H.S., for a collection of Peaches and Nectarines. 29. To Mr. M'Ewen, for Figs. 30. To Mr. Ingram, for Green Gage Plums.

Silver Banksian Medals: 1. To Messrs. Cobbett, for a collection of Moss Roses in twelve varieties. 2. To the same, for a collection of Roses, in fifty varieties. 3. To Mr. Slowe, for a collection of Roses, in twenty-five varieties. 4. To Mr. Cripps, of Tunbridge Wells, for the same. 5. To Mr. Ward, of Woolwich, for a collection of twenty-four varieties of Carnations. 6. To the same, for a collection of twenty-four varieties of Piccotees. 7. To Mr.

Willmer, for the same. 8. To Messrs. Lane and Son, for twelve varieties of Fuchsia. 9. To Messrs. Henderson and Co., Pine Apple Place, Edgware Road, for the same. 10. To Mr. Robertson, for *Achimenes grandiflora*. 11. To Mr. Bailey, gardener to the Lord Archbishop of York, F.H.S., for *Crassula grandiflora miniata*. 12. To the same, for *Crassula nitida*. 13. To Mr. G. Hyde, gardener to B. Cotten, Esq., of Park House, Wanstead, for *Lisianthus Russellianus*. 14. To Mr. Fraser, for *Crowea saligna*. 15. To Mr. Robertson, for *Medinilla erythrophylla*. 16. To the same, for *Erica radiata*. 17. To Mr. May, of Woodford, Essex, for *Tristania neriifolia*. 18. To Mr. Bailey, for a miscellaneous collection of Fruit. 19. To Mr. Umpleby, gardener to H. Benyon, Esq., of Roundhay, Leeds, for Grapes. 20. To Mr. J. Godfrey, gardener to the Earl of Limerick, for the same. 21. To Mr. Parsons, for the same. 22. To Mr. Chapman, for the same. 23. To Mr. Henderson, for Pine Apples. 24. To Mr. Spencer, for Peaches and Nectarines. 25. To Mr. C. Ewing, gardener to O. F. Meyrick, Esq., F.H.S., for Peaches. 26. To Mr. Ferguson, gardener to his Grace the Duke of Buckingham, for Nectarines. 27. To Mr. Fleming, gardener to his Grace the Duke of Sutherland, F.H.S., for Peaches. 28. To Mr. Stanley, for a collection of Madras citrons. 29. To Mr. Pedrick, gardener to Henry Pownall, Esq., for Black Tartarian Cherries. 30. To Mr. Redding, for Cherries. 31. To Mr. D. Caldwell, gardener to E. Bligh, Esq., for a specimen Orange. 32. To Mr. Baxter, gardener to J. W. Cressey, Esq., of Poplar Cottage, Shepherd's Bush, for Cherries. 33. To Mr. Meyers, of Brentford, for the same. 34. To Messrs. Rollisson, for the second best-named collection (*one error in thirty plants*).

The Certificates of Merit: 1. To Mr. Catleugh, for a collection of twenty-four varieties of Carnations. 2. To Mr. J. T. Willmer, of the King's Road, Chelsea, for the same. 3. To Mr. Kendall, of Stoke Newington, for a seedling Fuchsia (*Erecta elegans*). 4. To Mr. Gaines, for a seedling *Pelargonium (Duchess of Leinster)*. 5. To Mr. Willmer, of Sunbury, for a seedling Carnation (*Mayo*). 6. To Mr. Norman, for a seedling Piccotee (*Beauty*). 7. To Mr. W. Cock, F.H.S., for a collection of Balsams. 8. To Mr. Cuthill, F.H.S., for *Lisianthus Russellianus*. 9. To Mr. Dawson of Brixton, for *Erica ampullacea major*. 10. To Mr. Hopgood, of Bayswater, for *Sollya linearis*. 11. To Mr. Robertson, for *Achimenes longiflora*. 12. To Messrs.

Henderson, for *Erica tetragona*. 13. To Mr. Robertson, for *Erica eximia*. 14. To the same, for *Erica tricolor elegans*. 15. To Mr. Gad, gardener to T. Lenox, Esq., F.H.S., for *Brugmansia floribunda*. 16. To Mr. T. Jackson, F.H.S., for the third best-named collection (*one error in twenty plants.*) 17. To Messrs. Fairbairn, for the fourth best-named collection (*one error in twenty plants*). 18. To Mr. Mylam, for the fifth best-named collection (*two errors in thirty-three plants*). 19. To the Hon. and Rev. Robert Wilson, F.H.S., for Raspberries. 20. To Messrs. Youell and Co., of Great Yarmouth, for Fastolf Raspberries.

* * * In consequence of *CC. 2, CC. 9, CC. 4, CC. 10*, having been exhibited as *new or rare plants*, instead of miscellaneous plants, so far as the three first are concerned, and as a single specimen of *orchidaceæ* in the case of *CC. 10*, the judges were obliged to pass them by, instead of assigning them the medals which they would otherwise have received. They also added that *Brugmansia floribunda* scarcely came within the meaning of "new or rare plants."

August 6, 1844. (REGENT STREET.)

ELECTIONS. The Marquis of Titchfield, Harcourt House, Cavendish Square; Major-General the Lord Saltoun, 1, Great Cumberland Street, and Philorth House, Frasburgh, N. B.; Sir F. Goodricke, Bart., Studley Castle, Bromsgrove; Sir J. W. Guise, Bart., Rendcombe Park, Gloucestershire, and 48, Eaton Place, London; Lieut.-Col. Sir H. Webster, of 31, Upper Brook Street; Col. R. Ferguson, Clarges Street; G. G. Kirby, Esq., 11, Waterloo Place, Pall Mall, and Grove House, Hammersmith; H. R. Yorke, Esq., M.P., 81, Eaton Square; T. Kelsall, Esq., 9, Upper Wimpole Street; W. Williams, Esq., Sketteroy, near Brecknock; T. Rawsthorne, Esq., Heysham Hall, near Lancaster; and F. L. Popham, Esq., Littlecott, Hungerford, *Fellows*. Also Dr. T. Cantor, of Penang, a *Foreign Corresponding Member*.

AWARDS. *Knightian Medals* to Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for a *Clerodendron paniculatum*, producing a spike of flowers fully eighteen inches in length. To Mr. Mountjoy, of Ealing, for a red-flowering *Lilium speciosum*, having four branches bearing seventy blossoms. To Mr. Edmonds, gardener to the Duke of Devonshire, *President*, for a *Cattleya crispa* with five fine spikes of flowers. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a magnificent *Cuphea Melvilla*. To Mr. Henderson, gardener to Sir G. Beaumont, Bart., for two Queen Pine-

apples, weighing 4 lbs. 5 ounces, and 4 lbs. 6 ounces. To Mr. Povey, gardener to the Rev. J. Thornycroft, for a handsome Providence Pine-apple, weighing 8 lbs. 13 ounces, and measuring 22 inches round, and 7 $\frac{1}{4}$ high: the number of pips in height was ten. To R. Thompson, Esq., of Stansty Hall, for three fine bunches of black Hamburgh Grapes, the heaviest of which weighed 1 lb. 8 ounces; and also for three beautiful bunches of Black Prince, weighing 1 lb. 8 ounces, and 1 lb. 6 ounces.

Banksian Medals to Messrs. Henderson, of Pine-apple Place, for a new Heath, named *Hendersonii*, with bright pink flowers; a fine *Babingtonia Camphorosmæ*; and a mass of *Achimenes hirsuta* growing in a shallow pan. Concerning the latter, Messrs. Henderson mentioned that they grew all the varieties of *Achimenes* in shallow pans: they imagined that the plants flower better under such treatment than when they are planted in deep pots. To C. F. Cox, Esq., of Stockwell, for a beautiful specimen of *Dendrobium chrysanthum*. To Mr. Belton, gardener to C. Winn, Esq., for a handsome brown Providence Pine, weighing 6 lbs. 11 ounces, and measuring 18 inches round and 9 inches high. Mr. Belton stated that the plant from which this was cut was only twelve months old; that the sucker was taken off the old stool, without roots, in 1843; was then potted, and in February was turned out of the pot into the bark-bed, being planted in chopped turf mixed with a small quantity of charcoal. The plant had been only five times watered with liquid manure since February. He added that, besides this, three other plants of the same age produced fruit, each exceeding 6 lbs. in weight.

NOVELTIES FROM THE SOCIETY'S GARDEN. A new variety of *Dendrobium secundum*, received from Mr. Fortune, who found it growing at Anger Point. It produces beautiful racemes of dark purple blossoms, which are much handsomer than the pale flowers of the old species. Also the new *Achimenes picta*, remarkable for the beauty of its spotted flowers and grayish marbled foliage.

BOOKS PRESENTED.

Transactions of the Zoological Society, Parts 2 and 3, vol. 3. Reports of the Council and Auditors of the Zoological Society, April 29, 1844, and Proceedings of the Society, Nos. 120 to 130, inclusive. From the Society.

The Athenæum for July. From the Editor.

The Florists' Journal, No. 60. From the Editor.

The Ladies' Flower Garden of Ornamental Perennials, No. 32. From Mrs. Loudon.

The Botanical Register for August. From the Publishers.

The Floricultural Cabinet for August. From Mr. Jos. Harrison.

Proceedings of the American Philosophical Society held at Philadelphia, Nos. 28 and 29, vol. 4. From the Society.

Hood on Warming Buildings, &c., 2nd edition. From the Author.

September 3, 1844. (REGENT STREET.)

ELECTIONS. M. C. B. Cave, Esq., 11, Upper Belgrave Street, and Stretton-en-le-Field, near Atherstone; and W. Stirling, Esq., of Kier, near Dumblane, Stirlingshire, N.B.

AWARDS. *A large Silver Medal* to Mr. Mills, gardener to Baroness de Rothschild, for a Providence Pine-apple measuring 13 inches in height, and 24½ round, and weighing 14½ lbs. The number of pips in height was twelve. This was the largest Pine ever produced before the Society; and excepting one lately cut from the same gardens, which, it was stated, weighed 15½ lbs., it is probably the largest ever raised in England. Independently of its size, it was beautiful in form. It had been raised in a pit contrived by Mr. Mills for growing Cucumbers in.

Banksian Medals: To Mr. Corbin, gardener to T. Hepburn, Esq., for a magnificent plant of *Lilium lancifolium album*, having eight stems, each bearing from eight to ten expanded blooms. To Mr. Parsons, gardener to A. George, Esq., for five fine bunches of Muscat of Alexandria Grapes.

Certificates: To Mr. Don, gardener to F. G. Cox, Esq., of Stockwell, for a fine specimen of *Aeolimenes pedunculata*. To Mr. Redding, gardener to Mrs. Marryat, of Wimbledon, for a specimen of *Guzmannia tricolor*. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for a collection of cut blooms of *Verbenas*. To Mr. Fish, gardener to H. H. Oddie, Esq., of Colney House, Barnet, for a Providence Pine-apple weighing 8 lbs. 7 ounces, and measuring 8 inches in height, and 19 inches in circumference. The number of pips was nine. To Mr. Jones, gardener to Sir Moore Disney, Bart., F.H.S., for specimens of *Grosse Mignonne Peaches*. To S. Platter, a cottager at Aylsham, for specimens of a seedling Apple; being of last year's growth, they were a little shrivelled, but were nevertheless in good preservation; they were stated to have been, until within the last few weeks, quite firm and juicy; they looked like some sort of Russet, and had the useful property of being preserved in good condition over a second season.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Æchmea discolor*, with beautiful crimson bracts or scales, out of which grow pretty violet blossoms. Cut specimens of *Iochroma tubulosum*, a new Mexican shrub, producing fine terminal clusters of deep porcelain-blue flowers. It was expected to prove sufficiently hardy for planting out-of-doors during

the summer months, but to require some protection in winter. Cut flowers of a new species of Lupine called *L. pubescens*, having very downy leaves, sent from Quito by Mr. Hartweg; and eleven plants of *Fuchsia floribunda*, a garden variety, showing the effects produced on that kind of plant by the use of different manures. The plants were all taken from the cutting-pan at the same time, and potted into 6-inch pots. The compost used was peat and loam in equal proportions. Of the first three plants, which were the best, No. 1 received one teaspoonful of Harris's liquid manure in half a pint of water; 2 had half an ounce of Apatite spread on the surface of the soil; and 3 had the same mixed in the soil. These three were nearly equal in every respect. Of the next three, two had each one ounce of charcoal, the one on the surface, the other mixed in the soil; the other received half an ounce of superphosphate of lime mixed in a pint of water. These were nearly equal, but somewhat inferior to the first three. Three others, one of which received an ounce of cow-dung mixed in the soil, another a quarter of an ounce of phosphate of ammonia mixed in half a pint of water, the third half an ounce of superphosphate of lime mixed in the soil, were inferior to the second three. No. 10, to which one teaspoonful of Hallett's concentrated liquid manure was given in half a pint of water, was the least luxuriant of the group. Each of these agents was repeated on the 6th of July, and the plants were never repotted after they were taken from the cutting-pan. All the plants under this experiment were larger and better than the comparative specimen, to which nothing was applied.

BOOKS PRESENTED.

The Botanical Register for September. From the Publishers.

The Athenæum for August. From the Editor.

Proceedings of the Geological Society of London, No. 98. From the Society.

The Journal of the Royal Geographical Society, part 1, vol. 14. From the Society.

The Journal of the Royal Agricultural Society of England, vol. 5, part 1. From the Society.

The Journal of the Royal Asiatic Society of Great Britain and Ireland, No. 15, part 1. From the Society.

Journal of the Bombay Branch Royal Asiatic Society, Nos. 5 and 6. From the Society.

October 1, 1844. (REGENT STREET.)

AWARDS. *Knightian Medals*: To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for various plants, especially a most beautiful specimen of *Aphelandra cristata*, nearly six feet high, producing six large heads of scarlet flowers. To Mr. Jack, gardener to R. G. Loraine, Esq., for a plant of *Dipladenia crassinoda*, a new stove twiner. To Mr.

Davy, gardener to G. Smith, Esq., for very fine bunches of Black Hamburgh grapes, and for what is called Wilmot's New Black Hamburgh Grape. The berries of this variety are much more fleshy and large than in the common Black Hamburgh, and are remarkable for having the surface covered with small indentations, as if they had been beaten by a hammer.

A Banksian Medal to Mr. Povey, gardener to the Rev. J. Thornycroft, for two handsome specimens of Black Jamaica Pine-apples, the largest of which weighed 5 lbs., and measured seventeen inches in circumference and nine inches in length, the number of pips being nine.

Certificates: To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for a good specimen of *Rodriguezia planifolia*. To Mr. Jackson, of Kingston, for *Chironia floribunda* and a handsome species of Begonia from the Oregon mountains, resembling *B. sanguinea*. To Mr. Gold, gardener to Sir W. W. Dixie, Bart., Bosworth Park, Leicestershire, for two Queen Pines, weighing 4 lbs. 8 oz., and 4 lbs. 10 oz., measuring fifteen inches in circumference, and ten inches in length, the number of pips being nine in both cases.

BOOKS PRESENTED.

Botanical Register for October. From the Publishers.
The Floricultural Cabinet for October. From Mr. Jos. Harrison.

The Florists' Journal, No. 62. From the Editor.

The Magazine (American) of Horticulture, from its commencement in 1835 to 1843, inclusive, 9 vols. From the Conductors, Messrs. Hovey, of Boston.

November 6, 1844. (REGENT STREET.)

AWARDS. **A Knightian Medal** to Mr. Webster, gardener to Mrs. Huskisson, of Earham, Chichester, for a beautiful cut specimen of *Renanthera coccinea*.

Banksian Medals: To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for various Orchids, especially *Galeandra Baueri*, *Mormodes citrinum*, and a finely-grown specimen of *Epidendrum nutans*. To Mr. G. Maude, gardener to E. C. L. Kay, Esq., for two Providence Pine-apples, the largest of which weighed 7 lbs. 11 oz., and measured 9 inches in circumference and 18 inches in height, the number of pips being twelve.

Certificates: To Mr. Jack, gardener to G. Loraine, Esq., for *Pleroma Benthamianum*, a Melastomad with beautiful deep violet blossoms. To Mr. Cuthill, of Camberwell, for *Leianthus nigrescens*, a plant nearly related to *Lisianthus*; it was about 7 feet in height, and covered with a multitude of nearly black star-shaped flowers. To Mr. Tant, gar-

dener to E. Johnstone, Esq., for a box of very fine Chrysanthemum blooms. To Mr. Jackson, of Kingston, F.H.S., for a well-grown specimen of Statice macrophylla. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for a plant of Achimenes pieta, in fine bloom : this was stated to have been grown in an intermediate house, the night temperature of which rarely exceeded 55°, and was frequently below 50°. The general impression among cultivators is, that this plant will not produce flowers sufficient at one time to make a first-rate specimen ; but half a dozen plants in one pot, as profusely covered with bloom as the one sent, would present a beautiful appearance. To Messrs. Henderson, of Pine Apple Place, for an exceedingly well-grown specimen of *Æschynanthus grandiflorus*. To Mr. Fleming, gardener to the Duke of Sutherland, for a specimen of a Cabul Melon, which weighed 5 lbs. 13 oz., and measured 21 inches in circumference ; Mr. Fleming stated that he had cut three of the same kind, weighing together 18 $\frac{3}{4}$ lbs., from plants grown in a vineyry, under the shade of vine-leaves ; the melons he cuts at this season he wraps in paper, and then lays them in a basket, the sides and bottom of which are also covered with paper ; he then lays a sheet of paper over the whole, and places the basket in a pine-stove for a period of eight or ten days, by which means the fruit acquires an excellent flavour, and is esteemed a great acquisition to the dessert during November. To Mr. Hammond, of Jersey, for various Pears, especially specimens of the Chaumontelle, Colmar, and Passe Colmar.

NOVELTIES FROM THE SOCIETY'S GARDENS. Phædranassa obtusa, a greenhouse bulb, which was sent from Peru by Mr. Hartweg, having scarlet and green blossoms, which have considerable resemblance to those of *P. chloracra*. An oblong scarlet fruit, about 6 inches in length, cut from a species of Trichosanthes, sent by Mr. Fortune from the northern parts of China.

BOOKS PRESENTED.

- Botanical Register for November. From the Publishers.
- Journal of the Agricultural and Horticultural Society of India. Nos. 9, 10, 12, vol. 2. From the Hon. Court of Directors of the E. I. Company.
- Grenier—Mobile—Vallery pour la Conservation des Graines. 8vo. Paris, 1841. From Mr. T. Birmingham.
- The Floricultural Cabinet for November. From Mr. Jos. Harrison.
- The Athenaeum for September and October. From the Editor.

December 3, 1844. (REGENT STREET.)

AWARDS. A Large Silver Medal to Messrs. Henderson, of Pine-Apple Place, for *Aphelandra aurantiaca*, said to have

been received from the Continent about two years ago, from Mr. Makoy ; this was probably the first time of its flowering in this country.

Banksian Medals : To Mr. Plant, gardener to J. H. Schroder, Esq., for *Dendrobium Pierardii* and *Brassia Wrayæ*. To Messrs. Veitch and Son, of Exeter, for two new sorts of *Tropaeolum* ; one a yellow flowering variety, not named ; the other a scarlet, called *Lobbianum*, in honour of their collector, Mr. Lobb, who sent it from Peru ; the latter had one fully-expanded bloom, of a very brilliant scarlet, and, judging from its numerous flower-buds, it had the appearance of being a free bloomer.

BOOKS PRESENTED.

The Botanical Register for December. From the Publishers.

The Journal of the Royal Asiatic Society, No. 15, Part 2. From the Society.

Transactions of the Linnean Society, vol. 19, part 3 ; the List of the Members for 1844, and Proceedings of the Society, Nos. 19 to 22 inclusive. From the Society.

Agricultural Chemistry, by George Cox. From the Author.

Chinese Works from G. T. Lay, Esq., viz. :

The Literary Housewife's Manual, containing

1. Chemical and Pharmaceutical Recipes.
 2. Useful Recipes.
 3. Medicine : Elemental Permutations, Celestial Harmonies in the Human Body.
 4. Astronomy, and the Culture of Flowers, &c.
- Also, The Preparation of Tea, from the Chinese original.

Agricultural Questions, and on Rearing the Silkworm.

Comptes rendus des Séances de l'Académie des Sciences à Paris, 1^{er} Semestre, 1844. From the Academy.

January 21, 1844. (REGENT STREET.)

ELECTIONS. Mrs. Stackhouse Acton, Acton Scott, Shrewsbury, and S. L. Stephens, Esq., Roehampton, Surrey, as Fellows. W. Rich, Esq., of Washington, and A. Oliveira, Esq., of Madeira, as Corresponding Members.

AWARDS. *A Banksian Medal* to Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for *Catasetum speciosum*, the rare *Angraecum bilobum*, and an enormous plant of *Centradenia rosea*.

Certificates : To Messrs. Veitch and Son, of Exeter, for a specimen of the new *Franciscea hydrangeaformis*. To Mr. Povey, gardener to the Rev. T. Thornycroft, for a handsome Montserrat Pine-apple, weighing 4 lbs. 1 oz., and measuring 15 inches in circumference and 10½ in length. To Mr. Toy, gardener to Col. Challoner, for five bunches of Black Hamburgh Grapes. To Mr. Paxton, gardener to the Duke of Devonshire at Chatsworth, for fine specimens of West's St. Peter's Grapes, said to have been grown without fire-heat, except what was necessary to exclude frost and preserve a dry atmosphere. It was also stated that the Vines

which produced these Grapes had for many years been allowed to break their buds by sun-heat alone, and that they had always borne large crops of well-ripened fruit, which had often been preserved fit for table until the end of March. To J. Moorman, Esq., for a collection of beautifully kept Pears, including the Napoleon.

NOVELTIES FROM THE SOCIETY'S GARDEN. Specimens of the Rymer Apple, which is one of the best varieties for kitchen use, and exceedingly productive. The crop of one tree of this variety near Nottingham, in the autumn of last year, was sold for 12*l.*; a fact worthy attention by cottagers and others possessing small gardens.

BOOKS PRESENTED.

The Botanical Register for January. From the Publishers.

The Florists' Journal, No. 66. From the Editor.

The Floricultural Cabinet for December and January. From Mr. Jos. Harrison.

Transactions of the Royal Society of Edinburgh, Vol. 15, Part 4; and Proceedings of the Society, Nos. 23 and 24. From the Society.

Journal of the Agricultural and Horticultural Society of India, No. 1, 1843, Vol. 2; and Calcutta Journal of Natural History, Nos. 16 and 17. 8vo. Calcutta, January and April, 1844. From the Hon. Court of Directors of the E. I. Company.

February 18, 1845. (REGENT STREET.)

ELECTIONS. The Rev. C. Pritchard, of Clapham, and Mr. E. Beck, of Isleworth.

Paper Read: An account of experiments made by W. H. Pepys, Esq., with Lupines sown in pure earths and manured with stimulants, in order to ascertain what the facts really are as regards the food of plants. The earths employed were white sand (silex), 75; pipe-clay (alumine), 15; whitening (carbonate of lime), 10. The pots in which the experiments were tried were green wine-bottles, having their bottoms cut off and reversed on a stand made to support them. The plants on showing bloom were taken up and weighed, and the following is the result:—

PURE EARTHS—LUPINES.

1. Watered with distilled water, 1 plant weighed	.	42·5 grs.
2. Guano	.	did not grow.
3. Subcarbonate of ammonia	.	ditto.
4. Muriate of ammonia	.	ditto.
5. Guano in the soil, 3 plants weighed	.	200 grs.
6. Daniel's manure, in do., 1 plant weighed	.	14 grs.
7. Soot, 3 plants weighed	.	215 grs.
8. Nitrate of potash	.	did not grow.
9. Ditto of ammonia	.	ditto.
In peat, loam, and rain-water, 1 plant weighed	.	192·5 grs.

From the above it appears that the result obtained from soot was greater than that from guano; that pure earths,

without organic matter, are almost sterile, even in the presence of alkaline matters; and that no artificial soil is to be compared with that which Nature herself provides.

AWARDS. *A large Silver Medal* to Mr. Mylam, gardener to S. Rucker, Esq., for a magnificent specimen of *Dendrobium speciosum*; it had on it between 20 and 30 large spikes of yellow blossoms, each pseudo-bulb, or little arm, producing 2 and 3 spikes.

A Knightian Medal to Mr. Fleming, gardener to the Duke of Sutherland, at Trentham, for six bunches of fine early Grapes.

Banksian Medals: To Mr. Ingram, gardener to Her Majesty, at Frogmore, for a bundle of Asparagus, containing 100 heads, which weighed 9 lbs. These heads were large and succulent, many of them as thick as the thumb. They were cut from beds heated in the alleys by hot water, which produces a much more steady heat, and is perfectly under control; the bed was covered by wooden shutters, to prevent the heat from escaping, and to throw off superfluous moisture. To Mr. Ayres, gardener to J. Cook, Esq., for two fine plants of the Double White *Primula sinensis*, about 9 inches in height and 15 inches in breadth, uniformly covered with bloom and healthy foliage. To Mr. Pamplin, for a large bush of *Epacris impressa*, about 3 feet in diameter, and the same in height, covered with bloom. To Messrs. Rollisson, of Tooting, for a fine specimen of *Dendrobium moniliforme*.

Certificates: To C. G. Thornton, Esq., F.H.S., for good specimens of Walnuts, of last year's growth, stated to have been preserved in dry wheat or oat-chaff, changed about once in three or four weeks. To J. Moorman, Esq., for a collection of Pears, including Napoleon, in the highest state of preservation.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Inga pulcherrima*, with beautiful upright brush-like blossoms of brilliant scarlet; and *Spathoglottis Fortuni*, a yellow flowered terrestrial Orchid, sent by Mr. Fortune from the mountains of Hong Kong.

BOOKS PRESENTED.

Transactions of the Society of Arts, Vol. 55. From the Society.
The Botanical Register for February. From the Publishers.

The Athenaeum for January. From the Editor.

Transactions of the Horticultural Society of Berlin. (17th Volume, 2nd Part.) From the Society.

Acta Academiae Naturalis Curiosorum, Vol. 19, Supp. 1; Vol. 20, Parts 1 and 2. From the Academy at Bonn.

March 4, 1845. (REGENT STREET.)

ELECTIONS. Capt. S. J. Widdrington, R.N., Newton Hall, near Darlington; R. Harvey, Esq., St. Day, Truro; J. Huskisson, Esq., Colonnade House, Holloway; A. Warde, Esq., Mount Hall, Holloway; S. Hancock, Esq., Kilburn; and Mr. W. J. Epps, Bower Nursery, Maidstone, Kent.

AWARDS. *A Knightian Medal* to Mr. J. Robertson, gardener to Mrs. Lawrence, for an immense plant of *Dendrobium nobile*, and a specimen of *Heliconia brasiliensis*, remarkable for its bright-red sheathing bracts and pure white flowers.

A Banksian Medal to Mr. Insley, gardener to G. Barker, Esq., for a fine plant of the rare *Chysis bractescens*, on which were 9 fully expanded blossoms.

A Certificate to Mr. Mills, of Gunnersbury Park, for a Cucumber called Browston hybrid, measuring upwards of 20 inches in length, and having the bloom still on the end. It had been grown in the pit of Mr. Mills's contrivance, heated by fermenting material.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Hovea pungens*, a fine Swan River species, with beautiful violet blossoms; and *Mussænda frondosa*, a shrub sent from Hong Kong by Mr. Fortune. The small tubular flowers are yellow, and an agreeable set-off by large greenish-veined white bracts into which one of the five small bristle-like sepals is transformed. The plant, though not new to gardens, had for some years been seldom seen in collections.

BOOKS PRESENTED.

- Le Bon Jardinier for 1845. From M. Vilmorin.
- The Botanical Register for March. From the Publishers.
- The Journal of the Royal Agricultural Society of England, Vol. 5, Part 2. From the Society.
- Extracts, translated from the Natural History of Orange Trees. By A. Risso. From Colonel Reid, Governor of Bermuda. (8vo. Bermuda, 1844.)
- The Athenaeum for February. From the Editor.
- The Floricultural Cabinet for February and March. From the Editor.

March 18, 1845. (REGENT STREET.)

ELECTIONS. Miss Sharpe, Chiswick Mall; R. Gosling, Esq., 5, Portland Place, and Botley's Park, Chertsey; W. S. Grey, Esq., No. 1, the Cloisters, Middle Temple, and Norton, Stockton-upon-Tees, Durham; and R. A. F. Kingscote, Esq., of Kingscote, Gloucestershire, and White's Club, St. James's Street, London.

AWARDS. *Knightian Medals*: To Mr. J. Robertson, gardener to Mrs. Lawrence, for various plants, especially *Phaius*

Wallichii, *Dendrobium Pierardi*, and *Illicium religiosum*, an evergreen shrub from Japan, whose fruit is burned by the Japanese as a perfume at their religious services. To Messrs. Rollisson, of Tooting, for a fine specimen of the very rare *Burlingtonia rigida*.

A Banksian Medal to Mr. Beck, of Isleworth, for an exceedingly fine plant of *Achimenes pieta*, in a slate pan.

Certificates: To Messrs. Henderson, of Pine Apple Place, for a sweet-scented European vernal *Cyclamen*, misnamed *Persicum rubrum*. To Messrs. Veitch and Son, of Exeter, for a seedling *Epaeris*, named *ardentissima*, with bright red flowers.

NOVELTIES FROM THE SOCIETY'S GARDEN. A cut specimen of the Mexican *Habrothamnus fasciculatus*, which had been figured in the Society's Transactions. In its native country this forms a noble shrub, about 5 feet in height, covered with multitudes of beautiful red blossoms, which are produced in clusters on the ends of the short flower-stems. It should be grown slowly in as cool a situation as it will admit of without injury; and all over-luxuriance should be checked.

BOOKS PRESENTED.

Troisième rapport Annuel de la Société Royale d'Agriculture de Guernesey. Pour 1844. Liste des prix pour 1845. From the Society.

Bulletin de la Société d'Horticulture de Seine et Oise, T. 5, Liv. 1. From the Society. (8vo., Versailles, 1845.)

Bulletin de la Société d'Horticulture Pratique du département du Rhône, Procès-Verbaux Séance du 14 Déc., 1844. From the Society. (8vo., Lyon, 1845.)

Journal of the Royal Geographical Society, Vol. 13, Part 2; Vol. 14, Part 2. From the Society.

April 1, 1845. (REGENT STREET.)

ELECTIONS. T. M. Coombs, Esq., of Clapham Common.

AWARDS. *Banksian Medals*: To F. G. Cox, Esq., of Stockwell, for fine specimens of *Cattleya Skinneri*, and *Dendrobium macrophyllum*. To Messrs. Loddiges, of Hackney, for a beautiful cut spike of an *Odontoglossum*, probably *O. Cervantesii*. To Messrs. Henderson, of Pine Apple Place, for various plants, especially for three pretty specimens of Cape Heath. To his Grace the Duke of Marlborough, for an exceedingly fine Providence Pine Apple, weighing 8 lbs. 1 oz., and measuring 20½ inches in circumference, and 9½ in height.

Certificates: To Mr. Mountjoy, of Ealing, for a seedling *Rhododendron*, raised from the seeds of *campanulatum*. To Mr. Epps, of Maidstone, for a plant of *Begonia coccinea*.

NOVELTIES FROM THE SOCIETY'S GARDEN. Boronia anemonæfolia, producing a multitude of gay rosy blossoms ; Trymalium odoratissimum, a Swan River shrub, remarkable for its sweet-scented minute white flowers ; and Acacia verniciflua.—Cuttings of the following Pears, viz., Knight's Monarch, Thompson's, Eyewood, and Broom Park, were distributed.

BOOKS PRESENTED.

The Botanical Register for April. From the Publishers.
The Florists' Journal, No. 70. From the Publisher.

April 15, 1845. (REGENT STREET.)

ELECTIONS. The Rev. J. J. Cleaver, Rector of Holme Pierrepont, Notts ; B. Smith, Esq., Colebrook Park, Kent ; Mr. R. Smith, Nurseryman, Worcester ; and Mr. John Hally, Nurseryman, Blackheath.

AWARDS. *A Large Silver Medal* to Messrs. Veitch and Son, of Exeter, for the beautiful new Fuchsia serratifolia, now for the first time exhibited.

A Knightian Medal to Mr. J. Robertson, gardener to Mr. Lawrence, F.H.S., for Erica concolor, seven feet in height, and with flowers ; and for a handsome plant of Dendrobium secundum.

Banksian Medals : To Mr. Fairbairn, of Clapham, for Erica favoides elegans, measuring nearly 3 feet in diameter, and richly clothed with healthy foliage down to the pot. To Mr. Green, gardener to Sir E. Antrobus, Bart., for a magnificent specimen of Erica aristata, literally covered with blossoms, and a fine Epiphyllum Russellianum.

Certificates : To Mr. Hutchison, gardener at Eatington Park, for a dish of Peaches, grown in pots in a Pine-stove, and the produce of a tree introduced into heat in the second week in November ; Mr. Hutchison mentioned that they were part of the second gathering, the first fruit having been fit for table on the 22nd March. To Mr. Prestoe, nurseryman, Shirley, for large specimens of Mushrooms, produced in the following manner :—In the first week in August, a quantity of fresh stable-manure was collected and dried ; a trench, 2 feet in width, 1 foot in depth, and 12 feet in length, was dug in the driest part of the nursery (running north and south) ; the dried dung was then put in and trodden firmly down, and cakes of Mr. Prestoe's improved Mushroom spawn were planted 1 foot distant from each other. The mould, which had been previously thrown on the side, was laid over the bed and firmly beaten by the spade. Thus the bed was formed and com-

pleted in one day. Common hurdles were covered with straw, and set over the bed in the form of the roof of a house ; the whole remained for about six weeks in the same state. Afterwards a gentle watering was given, and the Mushrooms began to make their appearance on the 1st of October, when 122 specimens were produced fit for table ; the bed continued to bear two or three months longer. As the thermometer began to sink below 40°, the ends of the roofed covering were closed, and about 3 inches of straw was laid over the bed. As the winter advanced, another covering of litter was laid on, which is all that was done to it ; the crop was extraordinary. A second bed was made on the following day in all respects as above, excepting the covering, which was a close made roof-like frame covered with painted canvas, and always kept close. The Mushrooms began to show about the usual time, and the bed produced an average crop. On the third day another bed was made as above described, but covered with a common Cucumber-frame and glass lights ; the Mushrooms were white, light, and insipid ; the two last beds were covered with common garden-mats.

BOOKS PRESENTED.

Proceedings of the Geological Society, Nos. 99 and 100. From the Society.

May 1, 1845. (REGENT STREET.—ANNIVERSARY.)

The following Fellows of the Society, viz.—

J. R. Gowen, Esq.,
H. Pownall, Esq.,
C. B. Warner, Esq.,

were elected new Members of the Council, in the room of—

Sir Oswald Mosley, Bart.,
R. H. Solly, Esq.,
Alexander Henderson, M.D.

The following Fellows of the Society were elected Officers for the ensuing year, viz.—

The Duke of Devonshire, President,
Thomas Edgar, Esq., Treasurer,
J. R. Gowen, Esq., Secretary.

The Auditors presented the following Report :—

“ The Auditors on this the thirty-sixth Anniversary have to report to the General Meeting of the Horticultural Society of London, that they have examined the Accounts for the past year with the vouchers and find them to be correct.

" By the annexed Statement of Receipts, Disbursements, and Liabilities, it will be seen that the Auditors have much reason to congratulate the Society on its increasing prosperity, the outstanding debt having been reduced by the amount of 1579*l.* 5*s.* 9*d.*, and the income continuing in an improving and satisfactory state.

" The Auditors have at the same time to bring under the notice of the Fellows, that the property belonging to the Society at Chiswick and Regent Street greatly exceeds the liabilities of the Society.

" The Auditors have in conclusion to acknowledge the assistance which they have received from the Officers of the Society during the investigation.

" GEO. BAIN.
" EDWARD BECK.
" ROB. WRENCH.
" R. W. EYLES.
" B. OLIVEIRA.

" 21, *Regent Street*, April 24th, 1845."

ABSTRACT OF RECEIPTS AND EXPENDITURE.

Between the 1st of April, 1844, and 31st of March, 1845.

RECEIPTS.		EXPENDITURE.	
	£. s. d.	£. s. d.	£. s. d.
To admission fees from Fellows, 40 at 6 Guineas each	252 0	By rents, rates, taxes, &c. Regent Street and Chiswick	143 11 3
To compositions for life from ditto, 7 at 40 Guineas each	294 0	By repairs of house in Regent Street	401 13 10
To subscriptions received from ditto	3118 10 0	By furniture and repairs	26 0 7
To amount of Transactions and Fruit Catalogue sold*	80 5 4	By housekeeping expenses, Regent Street	6 6 3
To rent of apartments let off in Regent Street	95 12 0	By salaries and collector's poundage	36 4 6
To garden produce sold	25 10 0	By interest on loan notes	102 5 8
To charges to Fellows for packing plants, &c.	48 19 0	By cost of Publishing Transactions	287 1 6
To miscellaneous receipts	8 18 6	By library charges, for books, binding, &c.	71 3 7
To Garden Exhibitions account : viz.	.	By printing and stationery	32 6 6
Amount of Receipts	£5521 8 6	By medals and rewards at Ordinary Meetings in Regent-st.	53 7 7
Deduct:		By cost of foreign missions and importations	27 11 6
Cost of Medals	£902 15 0	By expenses of meetings, postage, &c.	59 8 6
General Expenses	1615 19 0	By miscellaneous expenses in Regent Street	306 5 0
	2318 14 0	By ditto at the Garden for seeds, plants, carriage, &c.	123 15 8
	3102 14 6	By implements, mats, &c.	63 13 8
	7026 9 4	By garden tan, dung, mould, &c.	152 16 11
		By expenses of distribution Department	48 6 4
		By garden current labour	27 17 4
		By repairs at garden, heating apparatus, pump, &c.	110 11 9
		By coals and coke for Garden	205 5 8
			1146 14 2
			263 3 8
			90 5 2
			73 16 9
			54 8 0
			4305 13 6
		By Debt on open accounts due April 1, 1844 £23537 4 9	1217 4 10
			*
		By Debt on loan notes	740 14 2
		By debt at Bankers, April 1, 1845	2796 10 7
		By Balance in hands of Vice Secretary ditto	710 2 4 1
			1957 19 0
			7600 0 0
			230 9 3
			7332 13 4
			9557 19 0
			11137 4 9
			9557 19 0
			1379 5 9
			193 5 11
		* Viz. on medal account	
		Miscellaneous accounts	
			740 14 2

April 24, 1845.

GEO. BAIN,
EDWARD BECK,
ROB. WRENCH,
R. W. EYLES,
B. OLIVEIRA.

XXXIX

MISCELLANEOUS ACCOUNTS

May 6, 1845. (REGENT STREET.)

ELECTIONS. E. A. De Grave, Esq., 4, Park Row, Knightsbridge; H. J. Milbank, Esq., Thorpe Perrow, Bedale, Yorkshire; and Mr. C. Wood, Maresfield, Sussex.

- AWARDS. *Banksian Medals*: To Mr. J. Wells, gardener to W. Wells, Esq., for various beautiful cut blooms of Rhododendrons, especially of *R. campanulatum*. The principal part of them had been kept during winter under the canvass of a Tulip shade, assisted by mats at the sides in very severe weather, but exposed to the weather at all favourable times. To the Dean of Winchester for a collection of blooms of hybrid Rhododendrons, including a spurious variety of *R. campanulatum*. These had stood the winter unprotected in the open gardens at Bishopstoke. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for fine plants of the Begonias *coccinea* and *suaveolens*, and the pretty New Holland Chorozema *angustifolium*. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for an exceedingly handsome Erica *propendens*. To Messrs. Loddiges, of Hackney, for a plant of the new Epacris *miniata*.

Certificate: To Mr. Edmonds, gardener to his Grace the Duke of Devonshire, at Chiswick, for beautiful cut blooms of Rhododendron *formosum*.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Cyrtochilum hastatum*; *Eriostemon buxifolium*, a pretty New Holland shrub; *Spiraea Reevesiana*, a hardy species, but whose pretty heads of white flowers and fine green foliage render it well worthy of a place in the greenhouse, where it is very ornamental at this season. Seeds of *Buddleia Lindleyana* were also distributed. This is a native of Chusan, where it was found by Mr. Fortune, growing in ravines and on banks, in company with *Glycine sinensis*; it was said to form a fine shrub 5 or 6 feet in height, with clusters of deep violet flowers, probably as large as those of the Persian lilac.

BOOKS PRESENTED.

The Floricultural Cabinet, Nos. 146 and 147. From Mr. Jos. Harrison.

The Florists' Journal, No. 72. From the Editor.

The Botanical Register for May. From the Publishers.

The Flora Batava, Nos. 133 to 136. From His Majesty the King of Holland.

Proceedings of the American Philosophical Society, Nos. 30 and 31. From the Society.

A Public Discourse in commemoration of Peter S. Du Ponceau, LL.D, late President of the American Philosophical Society, delivered by Robley Dunglison, M.D., October 25, 1844. From the Society at Philadelphia.

Catalogus Plantarum in Horto Botanico Bogoriensi. (8vo., Batavia, 1844.)

Abhandlungen der Mathematische Physikalischen Classe der Bayerischen Akademie der Wissenschaften, Vol. 4, Part 1.

Bulletin, do., do., No. 56 to 64, 1843; and No. 1 to 50, 1844. From the Royal Bavarian Academy at Munich.

May 24, 1845. (GARDEN EXHIBITION.)

The weather on this occasion was propitious until about 5 o'clock P.M., when rain began to fall in torrents, and the promenade was in a few minutes deserted. The exhibition was perhaps the best that had ever been seen in the Gardens, being remarkable not only for the great quantity of beautiful specimens; but also for the general absence of bad ones. The number of visitors amounted to 3622, exclusive of exhibitors.

The AWARD was as follows:—

Large Gold Medals: 1. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of forty stove and greenhouse plants. 2. To Mr. Mylam, gardener to Sigismund Rucker, Esq., Jun., F.H.S., for twenty species of Exotic Orchidaceæ.

Gold Knightian Medals: 1. To Mr. Barnes, gardener to G. W. Norman, Esq., of Bromley Common, Kent, for a collection of forty stove and greenhouse plants. 2. To Mr. Frazer, of Lea Bridge Road, for a collection of twenty stove and greenhouse plants. 3. To Mr. J. Robertson, for twenty species of Exotic Orchidaceæ. 4. To Mr. Don, gardener to F. G. Cox, Esq., F.H.S., for twelve species of Exotic Orchidaceæ. 5. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for twenty varieties of Cape Heaths. 6. To Messrs. Fairbairn, Nurserymen, Clapham, for the same. 7. To Mr. Dodd, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of Fruit.

Gold Banksian Medals: 1. To Mr. Green, gardener to Sir E. Antrobus, Bart., F.H.S., for a collection of forty stove and greenhouse plants. 2. To Mr. Hunt, gardener to Miss Traill, of Hayes Place, Bromley, for a collection of twenty stove and greenhouse plants. 3. To Mr. Bruce, gardener to Boyd Miller, Esq., of Colliers Wood, Mitcham, for a collection of twelve stove and greenhouse plants. 4. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for twelve new varieties of Pelargonium. 5. To Mr. Gaines, of Battersea, for the same. 6. To Mr. R. Staines, of Middlesex Place, New Road, for twelve varieties of Pelargonium. 7. To Messrs. C. D. Smith, of Elizabeth Street South, Pimlico, for the same. 8. To Mr. Dobson, for twelve varieties of Roses in pots. 9. To Messrs. Lane and Co., of Great Berhampstead, for twenty-five varieties of Roses in pots. 10. To Messrs. Rollisson, of Tooting, for twenty species of Exotic Orchidaceæ. 11. To Mr. Williams, gardener to C. B. Warner, Esq., F.H.S., for twelve species of the same.

12. To Messrs. Veitch and Son, of Exeter, for six species of the same.
13. To Mr. Green, for twelve varieties of greenhouse Azalea.
14. To Mr. Hunt, gardener to Miss Trail, for twelve species of Cape Heaths.
15. To Messrs. Veitch and Son, for the same.
16. To Mr. John Green, for Tall Cacti in flower.
17. To Mr. M. Henderson, gardener to Sir George Beaumont, Bart., for a miscellaneous collection of Fruit.

Silver Gilt Medals: 1. To Mr. W. P. Ayres, gardener to James Cook, Esq., F.H.S., for a collection of twenty stove and greenhouse plants. 2. To Mr. Pawley, of Bromley, Kent, for a collection of twelve stove and greenhouse plants. 3. To Mr. May, gardener to E. Goodheart, Esq., of Langley Park, Beckenham, Kent, for a collection of six stove and greenhouse plants. 4. To Mr. Pawley, for six stove and greenhouse Climbers. 5. To Mr. W. Cock, F.H.S., for twelve new varieties of Pelargonium. 6. To Mr. Dobson, for twelve varieties of Pelargonium. 7. To Mr. Gaines, for the same. 8. To Mr. J. Slowe, gardener to W. R. Baker, Esq., F.H.S., for a collection of twelve Roses in pots. 9. To Mr. Eyles, gardener to Sir George Larpent, Bart., F.H.S., for six species of Exotic Orchidaceæ. 10. To Mr. May, for a collection of twenty species of Cape Heaths. 11. To Messrs. Rollisson, for the same. 12. To Mr. G. Plumly, gardener to C. J. Dimsdale, Esq., of Essenden Place, Herts., for a collection of twelve species of Cape Heaths. 13. To Mr. Frazer, for the same. 14. To Mr. Bruce, for a collection of six species of Cape Heaths. 15. To Mr. Dawson, of Brixton Hill, for the same. 16. To Mr. Falconer, gardener to Archdale Palmer, Esq., of Cheam, for twelve greenhouse Azeleas. 17. To Mr. Frazer, for six greenhouse Azaleas. 18. To Mr. Roe, gardener to J. J. Blandy, Esq., of High Grove, Reading, for *Saccobium guttatum*. 19. To Mr. Falconer, for *Azalea variegata*. 20. To Mr. Bassett, gardener to R. S. Holford, Esq., for *Aerides odoratum*. 21. To Mr. Smith, of Norbiton, for eleven Rhododendrons. 22. To Mr. Dodd, gardener to Sir G. Warrender, for Grapes. 23. To Mr. Davis, of Oak Hill Gardens, East Barnet, for Pine Apples.

Large Silver Medals: 1. To Mr. Epps, of Maidstone, for a collection of twelve stove and greenhouse plants. 2. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of six stove and greenhouse plants. 3. To Mr. Gaines, for six varieties of Pelargonium. 4. To Mr. Kinghorn, gardener to A. Murray, Esq., F.H.S., for six *Calceolarias*. 5. To Mr. Gaines, for the same. 6. To Mr. A.

Kendall, of Stoke Newington, for twelve varieties of Fuchsia. 7. To Alexander Rowland, Esq., F.H.S., for a collection of Roses, in twelve varieties. 8. To Mrs. Stedman, of Isleworth, for a collection of Roses, in twenty-five varieties. 9. To Mr. Pawley, for a collection of twenty varieties of Cape Heaths. 10. To Mr. Even Jack, gardener to R. G. Lorraine, Esq., of Wallington, Surrey, for a collection of six varieties of Cape Heaths. 11. To Mr. Bruce, for Tall Cacti in flower. 12. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for twelve greenhouse Azaleas. 13. To Mr. R. Plant, gardener to I. H. Schroeder, Esq., for six species of Exotic Orchidaceæ. 14. To Mr. Robertson, for Erica Propendens. 15. To Mr. John Spencer, gardener to the Marquis of Lansdowne, F.H.S., for a miscellaneous collection of Fruit. 16. To Mr. S. Barnes, gardener to Thomas Whitmore, Esq., for Grapes. 17. To Mr. Henderson, gardener to Sir George Beaumont, Bart., for the same. 18. To Mr. G. Wortley, gardener to I. F. Maubert, Esq., F.H.S., for the same. 19. To Mr. Mitchell, of Kemp Town, Brighton, for the same. 20. To Mr. M. Henderson, for Pine Apples.

Silver Knightian Medals: 1. To Mr. Cole, gardener to C. Lewis, Esq., of Blackheath Park, for a collection of six stove and greenhouse plants. 2. To Mr. Frazer, for a collection of six stove and greenhouse climbers. 3. To Mr. G. Stanley, for a collection of six Calceolarias. 4. To Mr. Gaines, for a collection of twelve varieties of Fuchsia. 5. To Mr. W. Taylor, gardener to J. Coster, Esq., of Streatham, for a collection of six Cape Heaths. 6. To Mr. Ivery, of Peckham, for a collection of Cinerarias. 7. To Mr. J. Dobson, for a specimen Rose, in a pot. 8. To Mr. Plumbeley, for a specimen Cape Heath. 9. To Mr. W. May, for Chorozema Henchmanni. 10. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for Hydrangea japonica. 11. To Mr. Cameron, of Birmingham, for Chloræa chrysanthæ. 12. To Messrs. Veitch and Son, for Franciscea Pohliana. 13. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for the best named collection. 14. To Mr. W. Walton, gardener to Capt. Hart, of East Hoathly, Sussex, for Grapes. 15. To Mr. Brewin, gardener to R. Gunter, Esq., F.H.S., for Pine Apples. 16. To Mr. Thomas Mac Laurin, gardener to Sir G. Sittwell, Bart., of Renishaw Hall, near Sheffield, for Peaches and Nectarines. 17. To Mr. Fleming, gardener to his Grace the Duke of Sutherland, F.H.S., for the same. 18. To Mr. D. Judd, gardener to W. H. Whitbread, Esq.,

F.H.S., for Melons. 19. To Mr. C. Ewing, gardener to O. F. Meyrick, Esq., F.H.S., for Strawberries. 20. To Mr. Toy, gardener to Col. Challoner, F.H.S., for the same. 21. To Mr. Wells, gardener to A. Glendinning, Esq., F.H.S., for Citrons. 22. To Mr. Gadd, of Betchworth Castle Gardens, Dorking, for Melons.

Silver Banksian Medals: 1. To Mr. Jack, for a collection of six stove and greenhouse plants. 2. To Mr. R. Glendinning, F.H.S., for the same. 3. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of six stove and greenhouse Climbers. 4. To Mr. Milne, gardener to C. Snell Chauncey, Esq., for a collection of Roses in twenty-five varieties. 5. To Mr. J. W. Dawson, for *Erica mundula*. 6. To Mr. Gaines, for twelve greenhouse Azaleas. 7. To Messrs. Lane and Son, for a collection of *Cinerarias*. 8. To Mr. Beck, for a Seedling *Pelargonium* of 1844, (Rosy circle.) 9. To the same for a Seedling *Pelargonium* of 1844, (Arabella.) 10. To Mr. Catleugh, of Hans Place, Chelsea, for a Seedling *Pelargonium* of 1844, (the Pearl.) 11. To Messrs. Veitch and Son, for *Eriostemon buxifolium*. 12. To Mr. Robert Pool, for *Boronia serrulata*. 13. To Mr. Bruce, for *Ixora coccinea*. 14. To Mr. R. Forrest, F.H.S., for *Statice macrophylla*. 15. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for *Daviesia cordifolia*. 16. To Messrs. Rollisson and Co., for the second best-named collection. 17. To Mr. Mylam, for the third best-named collection. 18. To Mr. Spencer, for Grapes. 19. To Mr. Toy, for Pine Apples. 20. To Mr. Dodd, for Nectarines. 21. To Mr. Spencer, for Strawberries. 22. To Mr. G. Wortley, for the same. 23. To Mr. John Hill, gardener to Thos. Davis, Esq., of East Acton, for Melons.

Certificates of Merit: 1. To Mr. W. Taylor, gardener to J. Coster, Esq., for a collection of six stove and greenhouse plants. 2. To the same, for a collection of *Cinerarias*. 3. To Mr. Kinghorn, for a seedling *Calceolaria*, (Exemplar.) 4. To Messrs. Smith, of Pimlico, for a seedling *Calceolaria*, (Smithii.) 5. To Mr. Hoyle, of Guernsey, for a seedling *Pelargonium* of 1845, (Mount Etna.) 6. To the same, for a seedling *Pelargonium* of 1845, (Isabella.) 7. To Mr. J. Hill, gardener to Thomas Davis, Esq., F.H.S., for *Kennedya monophylla*. 8. To Mr. Hunt, for *Boronia serrulata*. 9. To Mr. Cole, for *Brugmansia Knightii*. 10. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for *Gastrolobium spinosum*. 11. To Messrs. Booth, of Hamburgh, for *Odontoglossum cordatum*.

12. To Messrs. Veitch and Co., for *Tropæolum Lobbii*.
13. To the same, for a species of *Siphocampylus*.
14. To Mr. Green, for *Thunbergia chrysops*.
15. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for the same.
16. To Mr. Pawley, for the fourth best-named collection.
17. To Mr. May, for the fifth best-named collection.
18. To Richard Brook, Esq., F.H.S., for Apples.
19. To Mr. Mc Ewen, gardener to Colonel Wyndham, for Lemons.
20. To the same, for Melons.

June 3, 1845. (REGENT STREET.)

ELECTIONS. The Marquess of Breadalbane, 21, Park Lane and Taymouth Castle, Perthshire; C. C. Cook, Esq., of the New Finchley Road, St. John's Wood; F. G. Cox, Esq., of Stockwell; F. Yates, Esq., Streatham, Surrey; W. Wood, Esq., at Messrs. Childs' Banking House; and J. Ruskin, M.A., of Christ Church, Oxford, and Denmark Hill, near London.

AWARDS. *A Banksian Medal* to Sir T. D. Acland, Bart., for a bundle of Asparagus, which weighed 11 lbs. 13 oz. The heads were from 9 to 10 inches in length, thicker than the thumb, and, unlike the samples usually found in the London markets, they were eatable nearly all the way down.

Certificates: To Messrs. Henderson, of Pine Apple Place, for a handsome white variety of *Hindsia violacea*. To Messrs. Veitch and Son, of Exeter, for *Calceolaria floribunda*, a Peruvian species with small yellow flowers. To Mr. Piper, gardener to A. Ward, Esq., for an exceedingly well-grown plant of the *Calceolaria* (*Lady Constable*).

NOVELTIES FROM THE SOCIETY'S GARDEN. *Glossocomia ovata*, a hardy Indian herbaceous plant, producing pretty pale-coloured bell-shaped flowers which are elevated on long stalks above the foliage. Along with these was the Persian annual *Cochlearia acaulis*, a species of stemless Scurvy-grass, which forms little green patches closely studded with small pale starlike flowers. The Vice-Secretary also produced a Hyacinth bulb, covered with a brood of adventitious buds in the form of bulbs of various ages, the production of which had been obtained artificially. The bulb in question had begun to rot away at its base, without producing leaves or flowers, as frequently occurs with this plant. It was then removed from the water-glass in which it had been placed, and was transferred to a bed of damp sand, covered by a bell-glass, exposed to a north window,

and maintained day and night in a temperature within a degree or two of 60°. Here being exposed to conditions very favourable to the formation of leaf buds, that is to say, to equable warmth and moisture, and an abundance of diffused light, the surface of the scales of the bulb soon emitted little tubercles, which gradually organised themselves as young bulbs. In that state was the specimen now produced. The object of the experiment was to show that plants *may* be propagated from any part of their surface.

BOOKS PRESENTED.

- Comptes rendus des Séances de l'Académie Royale des Sciences à Paris, 2me Semestre, 1844. From the Academy at Paris.
- The Athenaeum for March, April, and May. From the Editor.
- The Botanical Register for June. From the Publishers.
- Théorie Élémentaire de la Botanique, par M. A. P. De Candolle. (3me édition, Paris, 1844.)
- Journal of the Agricultural and Horticultural Society of India. Parts 1 and 2, vol. iii. From the Society.
- List of the Geological Society to March 1, 1845. From the Society.
- The Florists' Journal, Nos. 72 and 73. From the Editor.

June 21, 1845. (GARDEN EXHIBITION.)

The weather was exceedingly propitious, and the exhibition of Flowers and Fruit magnificent. The number of visitors amounted to 12,355, exclusive of exhibitors.

The AWARD was as follows :—

Large Gold Medals: 1. To Mr. Barnes, gardener to G. W. Norman, Esq., of Bromley Common, Kent, for a collection of forty stove and greenhouse plants. 2. To Mr. Mylam, gardener to Sigismund Rucker, Esq., Jun., F.H.S., for twenty species of Exotic Orchids.

Gold Knightian Medals: 1. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of forty stove and greenhouse plants. 2. To Mr. Frazer, of Lea Bridge Road, for a collection of twenty stove and greenhouse plants. 3. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for twenty species of Exotic Orchids. 4. To the same, for twenty varieties of Cape Heaths. 5. To Messrs. Fairbairn, Nurseryman, Clapham, for the same.

Gold Banksian Medals: 1. To Mr. W. P. Ayres, gardener to James Cook, Esq., F.H.S., for a collection of twenty stove and greenhouse plants. 2. To Mr. Bruce, gardener to Boyd Miller, Esq., of Collier's Wood, Mitcham, for a collection of twelve stove and Greenhouse plants. 3. To Messrs. Rollisson, of Tooting, for twenty species of Exotic Orchids. 4. To Mr. Don, gardener to F. G. Cox, Esq., F.H.S., for twelve species of Exotic Orchids. 5. To Mr. Eyles, gardener to Sir George Larpent, F.H.S., for six

species of Exotic Orchids. 6. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for twelve new varieties of Pelargonium. 7. To Mr. Staines, of Middlesex Place, New Road, for twelve varieties of Pelargonium. 8. To Mr. Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for twelve varieties of Cape Heaths. 9. To Messrs. Veitch and Co., of Exeter, for the same. 10. To Messrs. Lane and Son, of Great Berkhamstead, for twenty-five varieties of Roses in pots. 11. To Mr. Green, for Tall Cacti in flower. 12. To Mr. Dods, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of Fruit.

Silver Gilt Medals: 1. To Mr. Green, gardener to Sir E. Antrobus, Bart., F.H.S., for a collection of twelve stove and greenhouse plants. 2. To Mr. May, gardener, to E. Goodheart, Esq., of Langley Park, Beckenham, Kent, for a collection of six stove and Greenhouse plants. 3. To Messrs. Paul and Son, of Cheshunt, for twenty-five varieties of Roses in pots. 4. To Messrs. Veitch and Co., of Exeter, for six species of Exotic Orchids. 5. To Mr. Cock, of Chiswick, F.H.S., for twelve new varieties of Pelargonium. 6. To Mr. Gaines, of Battersea, for the same. 7. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for twelve varieties of Pelargonium. 8. To Mr. Gaines, for the same. 9. To Messrs. Rollisson, for twenty varieties of Cape Heaths. 10. To Mr. Barnes, gardener to G. W. Norman, Esq., of Bromley Common, Kent, for twelve varieties of Cape Heaths. 11. To Mr. Frazer, for the same. 12. To Mr. May, gardener to E. Goodheart, Esq., for six varieties of Cape Heaths. 13. To Mr. Dawson, of Brixton Hill, for the same. 14. To Mr. Falconer, gardener to Archdale Palmer, Esq., of Cheam, for Tall Cacti in flower. 15. To Mr. May, gardener to E. Goodheart, Esq., for *Erica vestita coccinea*. 16. To Mr. Glendinning, of Turnham Green, F.H.S., for *Gardenia Stanleyana*. 17. To Mr. S. Barnes, gardener to Thomas Whitmore, Esq., F.H.S., of Apley Park, Salop, for Grapes. 18. To Mr. Turnbull, gardener to his Grace the Duke of Marlborough, F.H.S., for the same. 19. To Mr. Toy, gardener to Colonel Chaloner, F.H.S., for Pine Apples. 20. To Mr. J. Macintosh, gardener to the Marquess of Exeter, F.H.S., for Peaches and Nectarines.

Large Silver Medals: 1. To Mr. Evan Jack, gardener to G. Loraine, Esq., of Wallington, Surrey, for a collection of twelve stove and greenhouse plants. 2. To Mr. Falconer, gardener to Archdale Palmer, Esq., for a collection of six

stove and greenhouse plants. 3. To Mr. Evan Jack, for a collection of six species of Achimenes. 4. To Mr. Staines, for twelve new varieties of Pelargonium. 5. To Mr. Cock, F.H.S., for twelve varieties of Pelargonium. 6. To Mr. Gaines, for six varieties of the same. 7. To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of six varieties of Calceolaria. 8. To Mr. Gaines, for the same. 9. To Messrs. Tyso and Son, of Wallingford, for twenty-four varieties of Ranunculus. 10. To Mr. W. Taylor, gardener to J. Coster, Esq., of Streatham, for twelve varieties of Cape Heaths. 11. To Mr. Bruce, gardener to Boyd Miller, Esq., for six varieties of Cape Heaths. 12. To Mr. Epps, of Maidstone, F.H.S., for the same. 13. To Mr. Laing, of Twickenham, for twenty-five varieties of Roses in pots. 14. To Mr. R. H. Betteridge, of Abingdon, for a collection of Roses in fifty varieties.* 15. To Mr. Laing, for the same. 16. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for Tall Cacti in flower. 17. To Messrs. Lane and Son, for twelve varieties of Fuchsia. 18. To Mr. May, gardener to E. Goodheart, Esq., for a specimen Cape Heath. 19. To Mr. Bruce, gardener to Boyd Miller, Esq., for a specimen of Aphelexis humilis. 20. To Mr. Evan Jack, gardener to G. Loraine, Esq., for Dipladenia rosea. 21. To Mr. Eyles, gardener to Sir George Larpent, Bart., F.H.S., for a species of Aerides allied to A. affine. 22. To Mr. Spencer, gardener to the Marquis of Lansdowne, F.H.S., for a miscellaneous collection of Fruit. 23. To Mr. Dods, gardener to Sir George Warrender, Bart., F.H.S., for Grapes. 23. To Mr. M'Ewen, gardener to Colonel Wyndham, of Petworth, for Pine Apples.

Silver Knightian Medals: 1. To Mr. Slowe, gardener to W. R. Baker, Esq., F.H.S., for a collection of twelve stove and greenhouse plants. 2. To Mr. Epps, of Maidstone, F.H.S., for a collection of six stove and greenhouse plants. 3. To Mr. Evan Jack, gardener to G. Loraine, Esq., for six varieties of Cape Heaths. 4. To Mr. Glendinning, of Turnham Green, F.H.S., for the same. 5. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for six species of Pelargonium. 6. To Mr. Bromley, gardener to Miss Anderdon, the Mall, Hammersmith, for six varieties of Pelargonium. 7. To Messrs. Cobbett, of Chobham, for a

* N.B. It is the opinion of the Judges that No. 4, from Mr. J. Mitchell, of Piltdown, Maresfield, Sussex, was the best collection, but it was disqualified by not being shown according to regulations.

collection of Moss Roses, in twelve varieties. 8. To Mr. Parsons, gardener to A. George, Esq., of Enfield, for a collection of Roses, in fifty varieties. 9. To Messrs. Cobbett, for the same. 10. To Mr. G. Wemyss, gardener to J. H. Slater, Esq., of Newick Park, Uckfield, for a collection of Roses, in twenty-five varieties. 11. To Mr. Francis, of Hertford, for the same. 12. To Mr. Willmer, of Sunbury, for a collection of Pinks. 13. To Mr. Betteridge, of Abingdon, for a collection of Ranunculus. 14. To Mr. Beek, for a Seedling Pelargonium of 1844 (Aurora). 15. To Mr. Gaines, for twelve varieties of Fuchsia. 16. To Mr. J. Hill, gardener to Thos. Davis, Esq., F.H.S., East Acton, for Pimelea decussata. 17. To J. B. Cresswell, Esq., of Newcourt, near Exeter, for Cyrtoceras reflexum. 18. To Mr. Eyles, gardener to Sir George Larpent, Bart., F.H.S., for a species of Aerides allied to *A. crispum*. 19. To Messrs. Veitch and Son, of Exeter, for Gardenia Rothmannia. 20. To Mr. Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for Chorozema ovatum. 21. To Messrs. Rollisson, for the best named collection of plants. 22. To Mr. Davey, gardener to G. Smith, Esq., of Colney Hatch, for Grapes. 23. To Mr. Davis, gardener to A. Smith, Esq., F.H.S., for Muscat Grapes. 24. To Mr. Brown, gardener to C. W. Packe, Esq., M.P., F.H.S., for a Pine Apple. 25. To Mr. A. Parsons, gardener to A. George, Esq., for Pine Apples. 26. To Mr. Baggs, gardener to J. Schneider, Esq., F.H.S., for the same. 27. To Mr. Hamp, gardener to J. Thorne, Esq., of Mawbey House, South Lambeth, for the same. 28. To Mr. Dods, gardener to Sir George Warrender, Bart., F.H.S., for Peaches. 29. To Mr. M'Ewen, gardener to Colonel Wyndham, Petworth, for Melons. 30. To Mr. Foggo, gardener to the Marquess of Abercorn, F.H.S., for Figs.

Silver Banksian Medals: 1. To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of six stove and greenhouse plants. 2. To Mr. Dawson, for *Erica pulvрulenta*. 3. To Messrs. Paul and Son, for a collection of Moss Roses in twelve varieties. 4. To Mr. Williams, gardener to Alexander Rowland, Esq., F.H.S., for a collection of Roses in fifty varieties. 5. To Messrs. Paul and Son, for the same. 6. To Mr. Terry, gardener to Lady Puller, of Youngsbury, Herts, for a collection of Roses in twenty-five varieties. 7. To Mr. Henbrey, of Croydon, for a collection of Pinks. 8. To Mr. Thomas Starr Airzee, of 25, Vaughan Terrace, City Road, for a collection of Ra-

nunculuses. 9. To Mr. Beck, F.H.S., for a seedling Pelargonium (*Desdemona*). 10. To Mr. J. Robinson, gardener to James Simpson, Esq., Thames Bank, Pimlico, for a collection of Fuchsias. 11. To Mr. W. P. Ayres, gardener to James Cook, Esq., F.H.S., for *Achimenes multiflora*. 12. To Mr. W. Barnes, gardener to G. W. Norman, Esq., for *Aerides odoratum*. 13. To Mr. Parker, gardener to J. H. Oughton, Esq., of Roehampton, for a specimen *Pelargonium (Priory Queen)*. 14. To Mr. J. Green, gardener to Sir Edmund Antrobus, Bart., F.H.S., for *Lianthus Russellianus*. 15. To Messrs. Veitch and Co., for *Hoya trinervis*. 16. To Mr. Elliott, gardener to J. B. Boothby, Esq., F.H.S., for *Plumieria acuminata*. 17. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for the second best named collection of plants. 18. To Mr. Fleming, gardener to his Grace the Duke of Sutherland, F.H.S., for Grapes. 19. To Mr. Toy, gardener to Colonel Challoner, F.H.S., for the same. 20. To Mr. Davis, of Oak Hill, East Barnet, for the same. 21. To Mr. Spencer, gardener to the Marquess of Lansdowne, F.H.S., for Peaches and Nectarines. 22. To Mr. Kemp, gardener to P. Grillion, Esq., of East Acton, for Peaches and Nectarines. 23. To Mr. G. Leslie, gardener to Mrs. Fleming, of Stoneham Park, Southampton, for Melons.

Certificates of Merit: 1. To Mr. W. Cole, gardener to C. Lewis, Esq., of Blackheath Park, for a collection of six varieties of stove and greenhouse plants. 2. To Mr. W. Barnes, gardener to G. W. Norman, Esq., for *Cypripedium spectabile*. 3. To Messrs. Mountjoy and Son, of Ealing, for *Lilium testaceum*. 4. To Messrs. Veitch and Son, for six dwarf *Erica depressa*. 5. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for a specimen of a species of *Thysanotus*. 6. To Mr. Beck, F.H.S., for a seedling *Pelargonium* of 1844 (*Mustee*). 7. To the same for the same (*Sunset*). 8. To the same for the same (*Juno*). 9. To the same for a seedling *Pelargonium* of 1845 (*Shiner*). 10. To the same for the same (*Rosetta*). 11. To Mr. H. M'Conach, gardener to E. Vines, Esq., F.H.S., for a seedling *Pelargonium* of 1844 (*Gulnare*). 12. To Mr. Pearson, Nurseryman, Hampstead Road, for a seedling *Verbena* (*Hampstead Lily*). 13. To Mr. Henbrey, of Croydon, for a seedling *Pink* (*Beauty*). 14. To Mr. Standish, of Bagshot, for a seedling *Calceolaria* (*The Pet*). 15. To Mr. Gaines, for a seedling *Calceolaria* (*Compacta*). 16. To Messrs. Rollisson, for *Pitcairnia punicea*. 17. To Mr. Barnes, gardener to G. W. Norman, Esq., for the third

best named collection. 18. To Mr. Mylam, gardener to J. Rucker, Esq., Junr., F.H.S., for the fourth best-named collection. 19. To Mr. Dodemeade, gardener to W. Leaf, Esq., F.H.S., for Melons.

July 1, 1845. (REGENT STREET.)

ELECTIONS. Mr. F. Gaines, Nurseryman, Battersea ; Mr. J. F. Wood, of the Coppice, Nottingham ; and Mr. J. Pearson, of Hampstead Road, Middlesex.

AWARDS. *Banksian Medals* : To Messrs. Veitch and Son, of Exeter, for a new species of Calandrinia, named umbellata, stated to be hardy, having stood last winter, in Devonshire, in the open ground without protection, and in a situation by no means sheltered. To Mr. R. Fish, gardener to Col. Sowerby, for Peaches and Nectarines, said to be the last gathering from an early forced house.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Fedia graciliflora*, a hardy annual, forming a thick mass of pink flowers, which almost completely buried the bright green leaves. It was introduced through France from Algiers. *Begonia Dregei*, a Cape plant, covered with a profusion of white flowers ; *Lyperia pinnatifida* ; and *Phlomis Cashmeriana*, a half hardy plant with grey leaves and violet flowers, not remarkable for their beauty.

BOOKS PRESENTED.

The Botanical Register for July. From the Publishers.

Memorial of the Citizens of Cincinnati to the Congress of the United States, relative to the navigation of the Ohio and Mississippi rivers, (8vo. 1843.) From the Cincinnati Horticultural Society.

The Western Farmer and Gardener, and Horticultural Magazine, vol. 4, (1844.) Do., vol. 5, Nos. 1 to 10, (1845.) From the Cincinnati Horticultural Society.

Journal of the Royal Asiatic Society of Great Britain and Ireland, No. 16, part 1. From the Society.

The Floricultural Cabinet for June. From Mr. Jos. Harrison.

'The Way to Wealth,' the original of *Taou-choo-kung*. From Mr. Tradescant Lay, H. B. M. Consul at Amoy.

July 12, 1845. (GARDEN EXHIBITION.)

The weather on this occasion was favourable, and the exhibition excellent. The plants were in some respects finer than at any former meeting during the year, especially the Orchids and Heaths, and the fruit was admirable. The number of visitors amounted to 5963, exclusive of exhibitors.

The AWARD was as follows :—

Large Gold Medals : 1. To Mr. Barnes, gardener to G. W. Norman, Esq., of Bromley Common, Kent, for a collection of stove and greenhouse plants. 2. To Mr. Mylam, gar-

dener to Sigismund Rucker, Esq., Jun., F.H.S., for twenty species of Exotic Orchids.

Gold Knightian Medals: 1. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for a collection of forty stove and greenhouse plants. 2. To Mr. Frazer, of Lea Bridge Road, for a collection of twenty stove and greenhouse plants. 3. To Mr. J. Robertson, for twenty species of Exotic Orchids. 4. To Mr. Don, gardener to F. G. Cox, Esq., F.H.S., for twelve species of Exotic Orchids. 5. To Mr. Hunt, gardener to Miss Trail, of Hayes Place, Bromley, for a collection of twenty species of Cape Heaths. 6. To Messrs. Fairbairn, of Clapham, for the same. 7. To Mr. Ingram, gardener to her Majesty at Frogmore, for a miscellaneous collection of Fruit.

Gold Banksian Medals: 1. To Mr. W. P. Ayres, gardener to J. Cook, Esq., F.H.S., for a collection of twenty stove and greenhouse plants. 2. To Mr. Hunt, gardener to Miss Trail, of Hayes Place, Bromley, for a collection of twelve stove and greenhouse plants. 3. To Messrs. Rollisson, of Tooting, for twenty species of Exotic Orchids. 4. To Mr. S. M. Carson, gardener to W. F. G. Farmer, Esq., F.H.S., for six species of Exotic Orchids. 5. *To Mr. Dobson, gardener to Mr. Beck, F.H.S., for twelve new varieties of Pelargonium. 6. To Mr. W. Cock, of Chiswick, F.H.S., for twelve varieties of Pelargonium. 7. To Mr. Gaines, of Battersea, for twelve varieties of Pelargonium. 8. To Mr. Sloane, gardener to W. R. Baker, Esq., F.H.S., for a collection of twelve Roses in pots. 9. To Messrs. Lane and Son, for twenty-five Roses in pots. 10. To Mr. Green, gardener to Sir E. Antrobus, Bart., F.H.S., for a collection of twelve species of Cape Heaths. 11. To Mr. Frazer, of Lea Bridge Road, for the same.

Silver Gilt Medals: 1. To Mr. Bruce, gardener to Boyd Miller, Esq., of Colliers Wood, Mitcham, for a collection of twelve stove and greenhouse plants. 2. To Mr. R. May, gardener to E. Goodheart, Esq., of Langley Park, Beckenham, Kent, for a collection of six stove and greenhouse plants. 3. To Mr. F. Frazer, of Lea Bridge Road, for a collection of six stove and greenhouse climbers. 4. To Mr. Eyles, gardener to Sir George Larpent, Bart., F.H.S., for six species of Exotic Orchids. 5. To Mr. W. Cock, of Chiswick, F.H.S., for a collection of twelve new

* The Gold Banksian Medal for twelve new varieties of Pelargonium was withheld from the Nurserymen, because, in the opinion of the Judges, they either did not show new varieties, or, if new, they were of bad quality.

varieties of Pelargonium. 6. To Mr. Gaines, of Battersea, for a collection of twelve new varieties of Pelargonium. 7. To Mr. R. Staines, of Middlesex Place, New Road, for a collection of twelve varieties of Pelargonium. 8. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for a collection of twelve Roses in pots. 9. To Mrs. Stedman, of Isleworth, for a collection of twenty-five Roses in pots. 10. To Mr. J. Robertson, gardener to Mrs. Lawrence, for a collection of twenty species of Cape Heaths. 11. To Messrs. Rollisson, of Tooting, for the same. 12. To Mr. Barnes, gardener to G. W. Norman, Esq., for a collection of twelve species of Cape Heaths. 13. To Mr. May, gardener to E. Goodheart, Esq., of Langley Park, Beckenham, Kent, for a collection of six species of Cape Heaths. 14. To Mr. Dawson, of Brixton Hill, for the same. 15. To Messrs. Veitch and Son, of Exeter, for *Fuchsia serratifolia*. 16. To Mr. Falconer, gardener to Archdale Palmer, Esq., of Cheam, for *Renanthera coccinea*. 17. To Messrs. Veitch and Son, for *Aerides odoratum*. 18. To Mr. Frost, gardener to Lady Grenville, F.H.S., for Muscat Grapes. 19. To Mr. Parsons, gardener to A. George, Esq., Enfield, for a Providence Pine Apple. 20. To Mr. Mason, gardener to Sir Jno. Kenaway, Escot, Devonshire, for Pine Apples.

Large Silver Medals: 1. To Mr. Green, gardener to Sir E. Antrobus, Bart, F.H.S., for a collection of twelve stove and greenhouse plants. 2. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for a collection of six stove and greenhouse plants. 3. To Mr. Plant, gardener to J. H. Schröder, Esq., of Stratford, for six species of Exotic Orchids. 4. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for a collection of six species of Achimenes. 5. To Mr. R. Stains, for a collection of twelve new varieties of Pelargonium. 6. To Mr. W. Ambrose, of King Street, Battersea, for the same. 7. To Mr. W. Cock, F.H.S., for a collection of six varieties of Pelargonium. 8. To Messrs. Fairbairn, of Clapham, for six Calceolarias. 9. To Messrs. Norman, of Woolwich, for a collection of twenty-four varieties of Carnations. 10. To G. Edmonds, Esq., of Wandsworth Road, for a collection of twenty-four varieties of Piccotees. 11. To Messrs. Norman, for the same. 12. To Mr. Terry, gardener to Lady Puller, Youngsbury, Herts, for a collection of Roses, in fifty varieties. 13. To Messrs. Lane and Son, for the same. 14. To Mr. Bruce, gardener to Boyd Miller, Esq., for a collection of six species of Cape Heaths. 15. To Messrs. Henderson, of Pine Apple Place,

Edgeware Road, for the same. 16. To Mr. Jos. Robinson, gardener to James Simpson, Esq., of Thames Bank, Pimlico, for twelve varieties of Fuchsia. 17. To Mr. May, gardener to E. Goodheart, Esq., for Erica Parmentieria. 18. To Mr. Dawson, of Brixton Hill, for Erica Massoni. 19. To Messrs. Veitch and Son, of Exeter, for Siphocampylus coccineus. 20. To Mr. Kinghorn, gardener to A. Murray, Esq., F.H.S., for Veronica speciosa. 21. To Mr. Frazer, of Lea Bridge Road, for Crassula versicolor. 22. To Mr. May, gardener to E. Goodheart, Esq., for Erica radiata. 23. To Mr. Dawson, for Erica ampullacea. 24. To Messrs. Rollisson, for Erica inflata alba. 25. To Mr. Dods, gardener to Sir George Warrender, Bart., F.H.S., for a miscellaneous collection of Fruit. 26. To Mr. Fleming, gardener to His Grace the Duke of Sutherland, for Grapes.* 27. To Mr. S. Barnes, gardener to Thomas Whitmore, Esq., F.H.S., for the same. 28. To Mr. Wright, gardener to the Hon. Mrs. Rushout, for Grapes in pots. 29. To Mr. Moffatt, gardener to His Grace the Duke of Newcastle, at Clumber, for Frontignan Grapes. 30. To Mr. M'Ewen, gardener to Colonel Wyndham, F.H.S., for Pine Apples. 31. To Mr. Brewin, gardener to R. Gunter, Esq., F.H.S., for the same.

Silver Knightian Medals: 1. To Mr. Epps, of Maidstone, F.H.S., for a collection of twelve stove and greenhouse plants. 2. To Messrs. Norman, for a collection of twenty-four varieties of Pinks. 3. To Mr. J. W. Newhall, of Woolwich, for a collection of twenty-four varieties of Picotees. 4. To Mr. Terry, gardener to Lady Puller, for a collection of Moss Roses, in twelve varieties. 5. To Messrs. Lane and Son, for the same. 6. To Mr. Parsons, gardener to A. George, Esq., of Enfield, for a collection of Roses, in fifty varieties. 7. To Mr. Francis, of Hertford, for the same. 8. To Mr. Pond, of Wells' Road, Bath, for a collection of Roses, in twenty-five varieties. 9. To Mr. Plumley, gardener to C. J. Dimsdale, Esq., of Essenden Place, Herts, for a collection of six species of Cape Heaths. 10. To Mr. Epps, F.H.S., for the same. 11. To Mr. Conway, Nurseryman, Brompton, for a collection of six varieties of scarlet Pelargoniums. 12. To Mr. S. M. Carson, gardener to W. F. G. Farmer, Esq., F.H.S., for Erica ampullacea. 13. To Mr. Slowe, gardener to W. R. Ba-

* The Judges particularly commended the fine growth of the Black Hamburg Grapes (No. 1 PP.), from Mr. Williamson, Gardener to The Earl of Lonsdale, but had not the power to award a prize for them in consequence of their want of colour.

ker, Esq., for a specimen Rose, in a pot. 14. To Messrs. Fairbairn, for *Erica ampullacea*. 15. To Messrs. Veitch and Son, of Exeter, for *Calandrinia umbellata*. 16. To Mr. Gaines, of Battersea, for twelve varieties of *Fuchsia*. 17. To Mr. Mylam, gardener to S. Rucker, Jun., Esq., F.H.S., for the best-named collection of Plants. 18. To Mr. G. Stanly, gardener to H. Berens, Esq., F.H.S., for *Leschenaultia formosa*. 19. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for *Achimenes picta*. 20. *To Mr. Green, gardener to Sir E. Antrobus, Bart., F.I.H.S., for *Lisianthus Russellianus*. 21. To Mr. Foggo, gardener to the Marquess of Abercorn, F.H.S., for Grapes. 22. To Mr. Hamp, gardener to James Thorne, Esq., of Mawbey House, South Lambeth, for the same. 23. To Mr. Davis, of East Barnet, for the same. 24. To Mr. W. Carmichael, gardener to Mrs. Hawkins, Bignor Park, Petworth, for Pine Apples. 25. To J. H. Vivian, Esq., M.P., for a Providence Pine Apple. 26. To Mr. Brown, gardener to the Hon. Sidney Herbert, for Providence Pine Apples. 27. To Mr. Fleming, gardener to His Grace the Duke of Sutherland, for Peaches and Nectarines. 28. To Mr. Parsons, gardener to A. George, Esq., for Strawberries. 29. To Mr. Joynes, gardener to Mrs. Hall, Totteridge, Herts, for a Melon. 30. To Mr. Slowe, gardener to W. R. Baker, Esq., for the same. 31. To Mr. P. Lidiard, Bath, for Strawberries. 32. To Mr. Meyers, Brentford, for Cherries.

Silver Banksian Medals: 1. To Mr. Henbery, of Croydon, for a collection of twenty-four varieties of Pinks. 2. To Mr. Williams, gardener to A. Rowland, Esq., F.H.S., for a collection of Moss Roses in twelve varieties. 3. To Messrs. Cobbett, of Chobham, Surrey, for the same. 4. To Mr. Francis of Hertford, for the same. 5. To Mr. R. H. Betteridge, of Milton Hill, Abingdon, Berks, for a collection of Roses, in fifty varieties. 6. To Mr. S. Hooker, of Brenchley, Kent, for the same. 7. To R. Crutwell, Esq., of Bath, for a collection of Roses, in twenty-five varieties. 8. To Mr. Dobson, gardener to Mr. Beck, F.H.S., for a specimen Rose, in a pot. 9. To Mr. Plumbe, gardener to C. J. Dimsdale, Esq., for *Erica viridiflora*. 10. To Messrs. Henderson, for *Erica ventricosa grandiflora*. 11. To Messrs. Veitch and Son, of Exeter, for a new species of *Atropa* from Chili. 12. To Messrs. Rollisson, of Tooting,

* N.B.—Had this been exhibited in its proper place, under LL., it would have received a higher Medal.

for the second best-named collection of Plants. 13. To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for the third best named collection of Plants. 14. To Mr. Hunt, gardener to Miss Trail, for grapes. 15. To Mr. Chapman of South Lambeth, for the same. 16. To Mr. Hamp, gardener to J. Thorne, Esq., for Pine Apples. 17. To Mr. Collinson, gardener to the Marquess of Westminster, for Nectarines. 18. To Mr. Parker, gardener to J. H. Oughton, Esq., Roehampton, for Peaches and Nectarines. 19. To Mr. Snow, gardener to the Earl de Grey, for Peaches. 20. To Mr. Spencer, gardener to the Marquess of Lansdowne, F.H.S., for Peaches. 21. To Mr. Davis, gardener to A. Smith, Esq., F.H.S., for Melons. 22. To Mr. S. Barnes, for the same. 23. To Mr. James Tompkins, gardener to Sir R. W. Bulkeley, Bart., of Beau-maris, for the same. 24. To Mr. Elliott, gardener to J. B. Boothby, Esq., F.H.S., for Cherries. 25. To Mr. Stanly, gardener to H. Berens, Esq., F.H.S., for Citrons. 26. To Mr. Elliott, for Strawberries. 27. To Mr. Thos. Cole, Willow Rosary, Bath, for the same.

Certificates of Merit: 1. To Mr. R. H. Betteridge, for a collection of Moss Roses, in twelve varieties. 2. To Mr. S. Hooker, for the same. 3. To Messrs. Paul and Son, of Cheshunt, for the same. 4. To Mr. Slowe, gardener to W. R. Baker, Esq., F.H.S., for a collection of Roses in twenty-five varieties. 5. To Mr. W. P. Ayres, gardener to Jas. Cook, Esq., F.H.S., for a seedling Clerodendron. 6. To Mr. Barnes, gardener to G. W. Norman, Esq., for Clerodendron paniculatum. 7. To Mr. S. M. Carson, gardener to W. F. G. Farmer, Esq., F.H.S., for Rondeletia speciosa. 8. To Mr. Cornway, Nurseryman, Old Brompton, for six named Petunias. 9. To Mr. Pamplin, Nurseryman, Hornsey Road, for a seedling Heath called "Splendens." 10. To the same for a seedling Heath called "Magnifica." 11. To Mr. W. Burns, of Chevening, for cut specimens of the double Yellow Rose. 12. To Mr. Glendinning, Nurseryman, Turnham Green, F.H.S., for a Yellow Statice from China. 13. To Messrs. Fairbairn, for the fourth best-named collection of Plants. 14. To Mr. Barnes, gardener to G. W. Norman, Esq., for the fifth best-named collection of Plants. 15. To Mr. Whomes, gardener to E. Foster, Esq., Clewer, for a seedling Pelargonium called "Paragon." 16. To Mr. Best, Nurseryman, Reading, for a seedling Calceolaria called "Lippardii." 17. To Mr. Gaines, for a seedling Calceolaria "Alpha." 18. To Mr. Dods, gardener to Sir Geo. War-

render, Bart., F.H.S., for Peaches. 19. To Mr. Wright, gardener to the Hon. Mrs. Rushout, of Wanstead Grove, for the same. 20. To Mr. C. Ewing, gardener to O. F. Meyrick, Esq. F.H.S., for Peaches and Nectarines. 21. To Mr. W. Davis, gardener to John Disney, Esq., for Apples. 22. To Robert Crutwell, Esq., of Bath, for Strawberries. 23. To Mr. Foggo, gardener to the Marquess of Abercorn, F.H.S., for Figs.

August 5, 1845. (REGENT STREET.)

ELECTIONS. The Earl of Southampton, 66, Mount Street, and Whittlebury Lodge, Towcester; the Hon. R. P. Arden, Pepper Hall, Catterick; F. H. Cornewall, Esq., Delbury Hall, near Ludlow; W. Evetts, Esq., Woodstock, Oxon; J. G. Parry, Esq., Higham Court, Gloucester; W. W. Valk, M.D., Flushing, Long Island; W. S. A. Unthank, Esq., 34, St. Peter's Square, Hammersmith; and the Rev. J. Horner, Mills Park, Somerset.

AWARDS. *Knightian Medal* to Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for various Orchids, especially the little white-blossomed *Eria densiflora*, the rare *Cattleya granulosa*, and a fine *Aerides quinquevulnera*.

Banksian Medals: To Messrs. Fairbairn, of Clapham, for an exceedingly well-grown collection of Cape Heaths, especially two seedlings named *Vernonii* and *Wilsonii*. To Mr. Moore, gardener to the Earl of Auckland, for a capital specimen of the beautiful twining Brazilian plant *Stigmaphyllon aristatum*, about 4 feet in height.

Certificates: To Messrs. Brown and Attwell, of Uxbridge, for 20 varieties of Carnations, and the same number of Picotees. To Mr. Ferguson, of Aylesbury, for an excellent specimen of *Oncidium incurvum*. To Mr. Cole, gardener to C. Lewis, Esq., for a fine plant of *Clerodendrum fallax*. To Mr. Cuthill, of Camberwell, for *Lisianthus Russellianus*. To C. B. Warner, Esq., for *Cattleya violacea*.

NOVELTIES FROM THE SOCIETY'S GARDEN. Beautiful masses, in pans, of the different species of *Achimenes*, which were raised in close pits, heated by no other means than by the rays of the sun. The advantage of this method of culture is that the plants are not drawn up weakly, but are stiff and short-jointed, and are better able to withstand any hardship to which they may happen to be exposed. *Niphœa oblonga*, a near relation of these, and whose tufts of white blossoms, produced at this season, render it very useful, was also grown in the same way, and with equal success,

without any artificial heat or moisture farther than what was obtained from sun-heat and damp arising from the earthen floor of the pits. Along with these was the pretty little hardy herbaceous plant, *Silene Schafta*, whose masses of pink, starlike blossoms recommend it to a place in the flower border. From the same collection were also *Viscaria oculata*, which, being raised in a greenhouse, had the eye better and the colour brighter than when grown in the open air; the pretty marbled-flowered *Aconitum ovatum*, a Himalayan production; and a plant of *Sobralia macrantha*, on the top of whose long reedy stems were produced magnificent purple blossoms, 5 or 6 inches across.

BOOKS PRESENTED.

- Journal of the Royal Agricultural Society of England, Vol. 6, Part 1. From the Society.
 Journal of the Royal Geographical Society of London, Vol. 15, Part 1. From the Society.
 The Botanical Register for August. From the Publishers.
 The Florists' Journal, Nos. 74 and 75. From the Editor.
 Proceedings of the Linnean Society, Nos. 23 and 24. From the Society.
Annales de la Soc. Royale d'Agriculture, &c., de Lyons, t. 7. From the Society.
 Proceedings of the Royal Society of Edinburgh, Nos. 25 and 26.
 Transactions of the same, Vol. 16 and Vol. 17 (of each), Part 1.
 Transactions of the Agricultural Society of Vienna, Part 1, Vol. 2, 2nd Series. From the Society.
 The Athenaeum for June. From the Editor.
Mémoires de la Soc. de Physique et d'Histoire Naturelle de Genève, t. 10. 2^e p. From the Society.

September 2, 1845. (REGENT STREET.)

ELECTIONS. J. Ridgway, Esq., Wallsuchen, Bolton, Lancashire; and Henry Winch, Esq., Liverpool.

AWARDS. *Knightian Medals*: To Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for two fine specimens of *Dendrobium chrysanthum*, and one of *Aphelandra cristata*. To Mr. Dawson, of Brixton Hill, for two magnificent Cape Heaths; and to Mr. Scott, gardener to Sir George Staunton, Bart., for three ripe Mangoes.

Banksian Medals: To Messrs. Veitch and Son, of Exeter, for a new species of *Salpiglossis* from Chili. To Mr. Ayres, gardener to J. Cook, Esq., F.H.S., for a well-bloomed plant in a pot of *Echites splendens*, said to have been grown in a brisk bottom heat. To Mr. Jackson, of Kingston, F.H.S., for various plants, especially specimens of *Statice sinuata* and *Erica retorta*.

Certificates: To Messrs. Rollisson, of Tooting, for *Miltonia spectabilis*. To Mr. Ayres, gardener to J. Cook, Esq., for the long lost *Platycodon grandiflorum*, recently reintroduced by Mr. Fortune. To Mr. Carton, gardener to His Grace

the Duke of Northumberland, for various seedling *Gloxinias* raised between *Sinningia hirsuta* and *G. caulescens*, the object being to obtain the arborescent character of the former with the better coloured flowers of the latter. To Mr. Chapman, of Brentford, for specimens of his Prince of Wales Plum.

NOVELTIES FROM THE SOCIETY'S GARDEN. Mr. Fortune's yellow flowered Statice, a blooming plant of *Lilium lancifolium album*, which had been grown from a single scale, and brought to the state in which it was shown in the short period of four years. *Indigofera decora*, *Chirita sinensis*, *Anemone japonica*, from Mr. Fortune, from the North of China; *Tacsonia mollissima*; and the Kashan melon, raised from seeds, received from T. Farrant, Esq., from Persia, being the first of its fruit that has been raised in this country.

BOOKS PRESENTED.

A Lecture on the application of Chemistry to the details of Practical Farming. By Albert James Bernays. From the Author.
The Atheneum for July.
The Botanical Register for September.

October 7, 1845. (REGENT STREET.)

ELECTIONS. Captain E. M. Daniell, the Linns, Carshalton, Surrey; W. Deedes, Esq., M.P., Sandling Park, Hythe; T. Dent, Esq., 8, Hyde Park Terrace; G. W. Newell, Esq., Holyport, near Maidenhead, Berks; W. Paynter, Esq., 21, Belgrave Square; S. Smith, Esq., 17, Hyde Park Gardens, and Charnandean, Worthing; and G. Wood, Esq., of Hanger Hill, Ealing, Middlesex.

AWARDS. *Large Silver Medal* to Messrs. Henderson, of Pine Apple Place, for a collection of variegated plants, more especially for a new plant named *Ruellia maculata*, with leaves finely overlaid with silvery markings.

Knightian Medals: To Mr. M'Ewing, gardener to Colonel Wyndham, for a specimen of the Antigua Queen Pine Apple, weighing 8 lbs. 3 oz., and measuring 20 inches in circumference, and 10 inches in height; the number of pips was 11; and to Mr. Ingram, Royal Gardens, Frogmore, for four Queen Pine Apples, weighing respectively 4 lbs. 12 oz., 4 lbs. 13 oz., 5 lbs. 3 oz., and 5 lbs. 4 oz.: the heaviest of them measured 16 inches in circumference, and 9½ inches in length; the number of pips was 13.

Banksian Medals: To Mr. Mitchell, gardener to Sir B. Hall, for two handsome specimens of the Ripley Queen Pine

Apple, one 5 lbs., and the other 5 lbs. 8 oz., the latter measuring 17 inches in circumference and 10 inches in height ; the number of pips was 14. To Mr. Sellers, gardener to L. V. Watkins, Esq., for a Queen Pine, weighing 4 lbs. 11 oz. To Mr. Carton, gardener to His Grace the Duke of Northumberland, at Syon, for the scarlet-flowered *Ruellia macrophylla*, and a cut specimen of *Elate sylvestris*, having a curious flat flower-stem. To Mr. Robertson, gardener to Mrs. Lawrence, F.H.S., for various Orchids, especially specimens of *Oncidium Harrisonianum*, and *Saccocaulium papillosum*. To Mr. Redding, gardener to Mrs. Marryatt, F.H.S., for plants of *Zygopetalum maxillare* and *Odontoglossum grande*.

Certificates : To Messrs. Veitch and Son, of Exeter, for a *Philibertia*, sent by Mr. W. Lobb, from Peru. To Mr. Mason, gardener to Sir J. Keunaway, Bart., for four Queen Pines, the heaviest weighing 4 lbs. To Mr. Joy, gardener to — Sloane, Esq., for excellent bunches of Black Hamburgh Grapes. To Mr. Steadman, gardener to J. Berens, Esq., for the same ; and to Mr. Mitchell, gardener to W. Whitmore, Esq., for very large specimens of the Swan's Egg Pear.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Cattleya maxima*, a species collected by Mr. Hartweg, in Peru, and equal in beauty to *C. Mossiae*.

BOOKS PRESENTED.

- The Athenaeum for August and September. From the Editor.
- Comptes rendus Hebdomadières des Séances de l'Académie des Sciences à Paris, 1^{er} Semestre, 1845. From the Academy.
- Ricerche sull' Arancio fetifero. From the Author, Signor Michele Tenore. (4to., Modena, 1843.)
- Botanical Register for October. From the Publishers.
- The Florists' Journal, No. 78. From the Editor.
- The Floricultural Cabinet for August and September. From Mr. Joseph Harrison.
- Notiz über den Kaiserlich Botanischen Garten zu St. Petersburg. By Dr. Fischer, Director of the Garden. From the Author.
- Index decimus Seminum que Hort. Bot. Imp. Petrop. pro mutua commutatione offert, &c. From Dr. Fischer.
- Traité de la Culture des Plantes de terre de Bruyère, &c. Par M. Victor Paquet. From the Author. (12mo., Paris, 1844.)

November 4, 1845. (REGENT STREET.)

ELECTIONS. E. R. Tunno, Esq., 19, Upper Brook Street, and Warnford Park, Hants ; J. S. Barry, Esq., Marybury, Cheshire, and Foaty, Cork ; and G. Wood, Esq., Rochford, Essex.

AWARDS. *Knightian Medals* : To Mr. Moore, gardener to R. Hanbury, Esq., for a magnificent *Cattleya labiata* ; and to Mr. Smith, gardener to the Hon. J. Norton, of Anningsley,

Chertsey, for very fine bunches of Muscat of Alexandria Grapes.

Banksian Medals: To Mr. Robertson, gardener to Mrs. Lawrence, F.H.S., for various plants, especially a fine specimen of the violet-flowered variety of *Epiphyllum truncatum*, grafted on *Cereus speciosissimus* in the form of a pyramid; and to Mr. Glendinning, of Turnham Green, for *Physanthus auricomus*, a new sweet scented white-flowered stove twiner.

Certificates: To Messrs. Paul of Cheshunt, for a beautiful collection of cut Roses; to Messrs. Chandler and Son, of Vauxhall, for boxes of very fine *Chrysanthemum* blooms. To Mr. Povey, gardener to the Rev. J. Thornycroft, for three specimens of Black Jamaica Pine Apples, the heaviest weighing 4 lbs. 12 oz.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Manettia bicolor*, covering a cylindrical trellis, 4 feet in height, profusely covered with flowers down to the pot, and *Mastacanthus sinensis*, a blue-flowered Labiate plant, sent from China by Mr. Fortune.

BOOKS PRESENTED.

Instructions Populaires sur les Moyens de combattre et de détruire la Maladie Actuelle (Gangrène humide) des Pommes de Terre, &c. Par C. H. Morren. From the Author. (12mo., Brussels, 1845.)

Proceedings of the Zoological Society, Nos. 131 to 144 inclusive, and *Reports of the Council and Auditors at the Annual Meeting held April, 29, 1845.* From the Society.

The Floricultural Cabinet for November. From Mr. Jos. Harrison.

The Botanical Register for November. From the Publishers.

Proceedings of the Geological Society of London, Nos. 101, 102, and 103. From the Society.

December 2, 1845. (REGENT STREET.)

AWARDS. *Knightian Medals*: To Mr. Plumbly, gardener to C. J. Dimsdale, Esq., for four magnificent Cape Heaths, especially one of *E. hiemalis*, measuring about 5 feet across, and 4 feet in height; and to G. Crawshay, Esq., of Colney Hatch, for fine bunches of Black Hamburg Grapes, grown without the aid of fire-heat till about the beginning of November, when slight fires are made, not for the purpose of raising the temperature, but for keeping out frost and drying up damp.

Banksian Medals: To Mr. Robertson, gardener to Mrs. Lawrence, for a charming plant of *Saccolabium denticulatum*, *Epidendrum viscosum*, a species from Central America, and the scarlet-flowered *Pitcairnia splendens*. To Mr. Moore, gardener to the Earl of Auckland, for two plants

of the starry Dysophyl, a pretty little Indian annual, looking something like a Bedstraw.

NOVELTIES FROM THE SOCIETY'S GARDEN. Specimens of the Beurré d'Aremberg Pear, both from a wall and a standard. Those from the latter were not a quarter so large as the fruit from the wall; but were much better flavoured, and assumed a different appearance, being quite covered over with russet.

BOOKS PRESENTED.

The Botanical Register for December. From the Publishers.
 The Flora Batava, Nos. 137 and 138. From His Majesty the King of Holland.
 The Proceedings of the Geological Society of London, Nos. 103, Vol. 4. From the Society.
 Paxton's Magazine of Botany, for October and November. From the Editor.
 The Floricultural Cabinet for October. From Mr. Jos. Harrison.
 The Athenaeum for October. From the Editor.
 The Catalogue of the Botanic Garden at Buitenzorg (Batavia.) From J. Dupuy, Esq.
 Transactions of the Linnean Society, Vol. 19, Part 4. Proceedings of the Society,
 Nos. 23 and 24; and list of the Society for 1845. From the Society.
 The Fruits and Fruit Trees of America, &c. From the Author, Mr. A. J. Downing.
 (svo., New York, 1845.)
 Archives du Muséum d'Histoire Naturelle, t. 4, Livs. 1 and 2. From the Museum.

January 20, 1846. (REGENT STREET.)

ELECTIONS. J. S. Schroeder, Esq., of Stratford Green, Essex; and M. Louis Van Houtte, of Ghent.

AWARDS. *Knightian Medal* to Mr. Mylam, gardener to S. Rucker, Esq., of Wandsworth, for a charming collection of Orchids, comprising several remarkable specimens, more especially one of *Cœlogynæ cristata*, producing 4 spikes, each containing five white blossoms.

Banksian Medal to Mr. Green, gardener to Sir E. Antrobus, Bart., of Lower Cheam, for a beautiful plant of *Gesnera zebrina*, and a large mass of *Epiphyllum truncatum*, covered with bloom down to the pot. Some account of the culture of the latter appeared at p. 130.

Certificates: To Mr. Ivery, of Peckham, for his blue seedling *Cineraria*, named Conqueror. To Mr. Dawson, of Brixton Hill, for two Cape Heaths. To Sir C. Monek, Bart., F.H.S., for samples of Lemons and Forbidden Fruit. To Mr. Toy, gardener to Col. Challoner, for specimens of West's St. Peter's Grape; and to J. Moorman, Esq., of Portland Place, Clapham Road, for a collection of Pears in excellent preservation.

NOVELTIES FROM THE SOCIETY'S GARDEN. A magnificent cut spike of *Lælia superbiens*, and a beautiful new lilac-

flowered Daphne, named *Fortuni*, sent from China by Mr. Fortune.

BOOKS PRESENTED.

Fourteenth Annual Report of the Royal Horticultural Society of Cornwall. From the Society.
Le Bon Jardinier for 1846. From M. Vilmorin.
The Floricultural Cabinet for January. From Mr. Jos. Harrison.
The Botanical Register for January. From the Publishers.
Journal of the Royal Geographical Society, Vol. 15, Part 2. From the Society.
Third Bulletin of the Proceedings of the National Institute for the Promotion of Science at Washington. From the Institute.
Miscellanea Botanica, Nos. 2, 3, and 4. From the Author, Signor Antonio Bertolini. (4to., Bologna, 1843, 1844.)

February 17, 1846. (REGENT STREET.)

ELECTIONS. The Duke of Cleveland, St. James's Square, and Raby Castle, Durham; Capt. F. Brandreth, 6, Stanhope Street, Hyde Park; and Mr. C. Lawson, Jun., of Edinburgh, Fellows; and the following Home Corresponding Members: Mr. W. P. Ayres, Mr. J. Barnes, Mr. W. B. Booth, Mr. J. Brown, Mr. D. Cameron, Mr. A. Campbell, Mr. T. Corbett, Mr. J. Duncan, Mr. J. Falconer, Mr. R. Fish, Mr. D. Ferguson, Mr. G. Fleming, Mr. A. Forsyth, Mr. J. Green, Mr. J. Henderson, Mr. E. Law, Mr. A. Scott, Mr. J. Spencer, Mr. G. Vinden, Mr. R. Wilson, Mr. J. B. Whiting, Mr. J. M'Nab, Jun., and Mr. R. Reid.

AWARDS. *Knightian Medal* to Mr. J. Robertson, gardener to Mrs. Lawrence, F.H.S., for three magnificent specimens of *Dendrobiums*, one of the *Wallichii*, and two of *nobile*, one of the latter measuring about 5 feet across, and 4 feet in height.

Banksian Medals: To Mr. W. P. Ayres, gardener to J. Cook, Esq., of Brooklands, for the magnificent specimen of *Erica hiemalis*, an account of which appeared at p. 131. To Mr. Fleming, gardener to the Duke of Sutherland, at Trentham, for perfectly ripe samples of Black Hamburgh Grapes.

Certificates: To Mr. Redding, gardener to Mrs. Maryatt, F.H.S., for a fine *Dendrobium nobile*. To Messrs. Henderson, of Pine Apple Place, for a good plant of *Phaius Wallichii*; to Mr. Simmons, of Coleman Street, for his new Hygrometer, figured at p. 129.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Inga pulcherrima*, with numerous scarlet heads of long silky stamens, *Selago distans*, a neat winter flowering plant, and *Primula denticulata*, a hardy Himalayan species, which when potted and

placed in the greenhouse is very ornamental for a long time in spring.

BOOKS PRESENTED.

- Floricultural Cabinet for February. From Mr. Jos. Harrison.
 A Treatise on the true Nature and Cause of the present destructive Disease of Potatoes, with the means of cure. By George Weightman, of Selston, near Nottingham. (36mo., London, 1846.)
 The Botanical Register for February. From the Publishers.
 Journal of the Royal Agricultural Society of England. Vol. 6, Part 2. From the Society.
 The Athenæum for January. From the Editor.

March 3, 1846. (REGENT STREET.)

ELECTIONS. J. J. Blandy, Esq., of High Grove, Reading.

AWARDS. *Knightian Medals*: To Mr. Robertson, gardener to Mrs. Lawrencee, F.H.S., for various Orchids, especially Schomburgkia violacea, and a new Odontoglossum with spotted white flowers; and to Messrs. Loddiges, of Hackney, for Ansellia Africana, a new Orchid from Tropical Africa, so named after Mr. John Ansell, who, when he was out with the Niger expedition, found it growing on the trunk of the Oil Palm in the Island of Fernando Po.

Banksian Medal to Mr. Green, gardener to Sir E. Antrobus, Bart., for a magnificent specimen of the best variety of Erica aristata.

Certificate to Messrs. Veitch and Son, of Exeter, for a new yellow-flowered Tropæolum, sent by Mr. Lobb from Peru.

NOVELTIES FROM THE SOCIETY'S GARDEN. Cuttings of the Glout Morceau de Cambron Pear, a variety little known, perfectly distinct from the Glout Morceau, and more resembling the Napoleon in its form and juicy flesh, which is, however, of firmer consistency than that of the last-named variety. It ripens in November.

BOOKS PRESENTED.

- Transactions of the Agricultural Society of Vienna. Vol. 2, Part. 2. New Series. From the Society.
 The Botanical Register for March. From the Publishers.
 Journal of the Royal Asiatic Society. No. 16, Part 2. From the Society.
 Flora Batava, Nos. 13⁹ and 140. From His Majesty the King of Holland.
 Transactions of the American Philosophical Society held at Philadelphia. Vol. 9, Part 2. New Series; and Proceedings of the Society. Nos. 32 and 33. From the Society.

March 17, 1846. (REGENT STREET.)

ELECTIONS. Mr. J. Glenny, 152, Strand, London; and Mr. T. A. Perry, King's Road, Chelsea.

AWARDS. *Banksian Medals*: To Mr. Rae, gardener to J. J. Blandy, Esq., Reading, for two specimens of Phaius gran-

difolius, one of *Dendrobium Pierardii*, and another of *Lycaste Skinneri*; and to Mr. Plumbly, gardener to C. J. Dimsdale, Esq., for several Cape Heaths.

Certificates: To Messrs. Henderson, of Pine Apple Place, for a beautiful collection of *Hyacinths*. To Mr. Green, gardener to Sir E. Antrobus, Bart., for a seedling *Azalea*, named *alba magniflora*, having large white blossoms in which was a shade of pink. To Messrs. Lane and Son, of Great Berkhamstead, for a pale rose-coloured seedling *Camellia*, named *Beauté Suprême*; and to Mr. Higgs, gardener to J. H. Barchard, Esq., for a basket of Keen's Seedling Strawberries.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Chysis bracteescens*, and two *Tropaeolums*—*tricolorum* and *brachyceras*—so managed as to have the appearance of a bush. This loose and natural habit is obtained by placing the top of a young Larch tree, with the rough lateral twigs attached, close to the bulbs before they spring, and leading the young shoot to this stake, round which it continues to twine, until the whole support is closely covered with foliage and flowers, presenting an exceedingly graceful appearance, and entirely dispensing with the trouble of training and tying.

BOOKS PRESENTED.

Philosophical Transactions of the Royal Society for the Years 1843, 1844, and 1845.
List of the Fellows, Nov. 30, 1845; and Proceedings of the Society, Nos. 56 to 61 inclusive. From the Society.

Transactions of the Horticultural Society of Berlin, Vol. 18, Part 1. From the Society.

The Athenæum for February. From the Editor.

The Quarterly Journal of the Geological Society, No. 5. From the Society.

Comptes rendus des Séances de l'Académie des Sciences à Paris, 2^{me} Semestre, 1845.
From the Academy.

April 7, 1846. (REGENT STREET.)

ELECTIONS. J. Timne, Esq., Briarly, Aighburgh, Liverpool; H. Bullock, Esq., Marden Ash, near Ongar, Essex; Mrs. Mattheson, Cleveland Row, St. James's; and J. Montgomery, Esq., of Brentford.

AWARDS. *Large Silver Medal* to Messrs. Veitch and Son, of Exeter, for a handsome new apetalous *Fuchsia*, discovered by Mr. W. Lobb near Lima, in Peru, producing rosy pink tubes of about 4 inches in length.

Knightian Medals: To J. Allnutt, Esq., of Clapham, for enormous bushes of *Corräea rosea* and *Epacris grandiflora*,

and for *Erica propendens*. To Mr. Robertson, gardener to Mrs. Lawrence, for various plants, especially a specimen of the Indian *Phaius Wallichii*, with 7 flower stems about 5 feet in height, and two plants of *Phalaenopsis amabilis*.

Banksian Medals: To Messrs. Fairbairn of Clapham, for a very large *Erica favoides elegans*, measuring at least 5 feet in height, and as much in diameter ; and to Mr. Hutchinson, gardener to E. J. Shirley, Esq., of Eatington Park, Warwickshire, for perfectly ripe specimens of Peaches and Nectarines, which were mentioned to have been produced by plants growing in pots in a Pine stove. The plants were introduced into heat about the 26th of October, and the first fruit was gathered about the middle of March. A strong heat and a moist atmosphere were kept up while the plants were growing, syringing them daily to keep down insects.

Certificates: To Mr. Glendinning, of Chiswick, for two plants of *Kennedya coccinea*. To Mr. Henderson, of St. John's Wood, for a group of Seedling Cinerarias, remarkable for their dwarf habit and spreading heads of bloom ; and to Mr. Povey, gardener to the Rev. J. Thornycroft, for a Providence Pine Apple, weighing 5 lbs. 10 oz., and measuring 10 inches in height and 16 inches in circumference ; the number of pips was 11. It was said to have been produced from a two-year old plant.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Coburgia incarnata*, a stove bulb recently sent from Peru by Mr. Hartweg ; *Maxillaria suaveolens*, somewhat resembling *M. aromatic*a ; a pretty little new white sweet-smelling Himalayan Primula, named *involucrata*, which may possibly turn out to be hardy ; and a beautiful cut specimen of the Mexican *Habrothamnus fasciculatus*. The following seeds were distributed : *Amaranthus albus*, a figure of which appeared at p. 157 ; *A. oleraceus*, the Shanghai Han-Tsi, a new tender vegetable, and like the former used as Spinach ; and the Hoo-sung, or Oo-sung, from Shanghai, likewise employed for culinary purposes, the succulent stem divested of the outside rind being the part eaten.—See p. 229.

BOOKS PRESENTED.

- Acta Academiæ Naturæ Curiosorum*, Vol. 21, Part 1. From the Academy at Bonn.
The Athenæum for March. From the Editor.
Neuvième Notice sur les Plantes rares cultivées dans le Jardin Botanique de Genève.
From the Author, Mr. Alph. De Candolle.
Notice sur le Jardin Botanique de Genève. From the same. (Aug., 1845.)
The Botanical Register for April. From the Publishers.

April 21, 1846. (REGENT STREET.)

ELECTIONS. The Earl of Scarborough, 41, South Street, Park Lane, and Rufford Abbey, Otterton ; and Mr. John Foster, 16, Wigmore Street.

Paper read: A communication from Mr. Maher, relative to the prevailing disease in Potatoes, the principal features of which were as follows :—A thunder-storm accompanied by high wind, having occurred in July, 1845, washing away the soil from the tubers, Mr. Maher was of opinion that the disease was caused by the heated water passing down along the cavity formed by the wind-waving of the haulm, and that the malady might be prevented from further extension by storing the tubers when taken up in perfectly dry earth. Specimens illustrative of the good effects of this mode of storing were shown to the meeting.

AWARDS. *Knightian Medals*: To Mr. Rae, gardener to J. J. Blandy, Esq., of Reading, for various Orchids, especially fine plants of *Cattleya Skinneri*, and *Peristeria Humboldtii*, the latter with 4 pendulous spikes of dingy spotted blossoms ; and to Mr. Ayres, gardener to J. Cook, Esq., of Brooklands, for an admirably managed *Stephanotis floribunda*.

Certificates : To J. Allnutt, Esq., of Clapham, for a very large specimen of *Kennedya coccinea*. To Mr. Dobson, gardener to Mr. Beck, of Isleworth, for a fine specimen of the larger and best variety of *Oncidium ampliatum*. To Messrs. Fairbairn, of Clapham, for *Erica vestita coccinea*. To Mr. Moore, gardener to R. Hanbury, Esq., for a plant of *Oncidium albo-violaceum* ; and to Mr. R. Fish, gardener to Col. Sowerby, for British Queen Strawberries ; this variety was stated to be most suitable for forcing when very early fruit is not wanted.

NOVELTIES FROM THE SOCIETY'S GARDEN. *Berberis trifoliata*, which has been proved to be hardy ; *Cuphea pubiflora*, and *Arctostaphylos nitida*, the latter a half hardy Mexican shrub of little beauty.



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